UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN 1986

Technical Report
June, 1986

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1.0 BACKGROUND

1.1 TERMS OF REFERENCE

In August 1985, Dean F.L. McEwen appointed a Steering Committee to conduct a study to update the Arboretum Master Plan and implement the recommendations of the Review Committee. The Steering Committee, chaired by Professor James R. Taylor, Landscape Architecture, included Dr. Erik Jorgensen, Director of the Arboretum and Dr. David Smith, Botany.

The Terms of Reference for the Committee included:

1) A review of the historical development and current status of the Arboretum.

2) The establishment of Goals and Objectives for the Arboretum.

3) An inventory and analysis of Physical Resources.

4) An assessment of User Group Needs.

5) The formulation of Design Principles for site and collection development.

6) A revised Physical Plan with phasing and funding implications.

7) The development of an Operational Plan that addresses institutional status and relationship to the University, the administrative structure and staffing for the Arboretum.

8) The establishment of a Five-Year Plan for the Arboretum.

9) Conduct a Symposium on Arboretum design and management that would involve recognized authorities in the field.

1.2 NEED

A Master Plan Review Committee was established in March 1985 by Dr. F.L. McEwen, Dean, O.A.C., to review the status of the original 1970 Master Plan and to make recommendations for future courses of action. The Committee submitted a report in August 1985 that included the following conclusions.

1) The 1970 Arboretum Master Plan is deficient or outdated in the

following areas:

a. Goals and Objectives for the development and operation of the facility are not well developed.

b. The document is lacking in detail related to environmental conditions, landscape architecture, user needs and other considerations.

c. The Plan is out of date. After fifteen years, significant changes in needs, programs, facilities and surrounding land use requires a reevaluation of the Master Plan.

d. The original study did not establish a model for the on-going management of operations and programming. The University of Guelph is operating on a Five-Year Plan basis and the Arboretum should conform to this planning horizon.

2) The present facility has impressive resources to serve the University and the community. However, the Committee felt that the full potential of the Arboretum has not yet been met in the following areas.

a. Research. The level and range of research based activities at the Arboretum are below the potential that could ultimately be supported by the facility. Liason with the University research community is not well established. Both University and industry needs require an updated evaluation.

b. Education. The Arboretum is not fully exploited as an educational resource. Very few courses are making use of the facility. Again, communications links are required with appropriate academic units to determine need and to illustrate potential. Environmental education to the general public is well handled through the J.C. Taylor Nature Centre. Perhaps more public interest programs should be established related to the appreciation and understanding of woody plants and their application.

c. Amenity. The Review Committee was favorably impressed with the scope of programs available to the public through the J.C. Taylor Nature Centre and the Arboretum Centre. Specific features include the location of sculpture and a fitness trail on the grounds.

Concern, however, was expressed about the overall landscape design quality of the site and the collections. Elements requiring further examination include the entry treatment, pedestrian circulation, spatial definition and design control.

3) The status of the Arboretum should be examined. It may be desirable to change from that of a support facility to a recognized Academic Unit to optimize the educational and research potential of the facility. Consideration should be given to establishing academic positions on the Arboretum staff to ensure retaining high

quality personnel and encourage both educational and research incentives.

4) The Administrative structure and staff complement should be reviewed with the objective of improving response to existing and future needs. An Operational Plan is required to provide direction with the context of a Five-Year horizon.

The Review Committee made four recommendations that address the Committee conclusions.

1) That a Comprehensive Master Plan Update for the University of Guelph Arboretum be commissioned.

2) That the study be funded, managed and executed as a joint OAC/ Arboretum project to be undertaken during the Fall and Winter Terms for completion in April 1986.

3) That a clear and succinct statement of Goals and Objectives be adopted for the Arboretum that would guide the planning and the operation of the facility.

4) That a Five-Year Plan be established as an administrative vehicle for the Arboretum.

1.3 HISTORY

The Arboretum at the University of Guelph is a resource which must satisfy many needs of the university community. While its founders had foreseen some of this role, time and circumstances have widened the role of the facility. In the earliest proposals the focus of attention was on practical or instructional roles, as reflected in this historical summary.

Since its establishment, the Ontario Agricultural College has required a collection of woody plants for instructional purposes. The original planting of the Ontario Agricultural college campus in the 1880's was planned to support teaching and research. William Brown, Professor of Agriculture and Farm Manager, began development of the present campus green for this purpose. These first collections of woody plants fulfilled some of the functions of an arboretum. The first campus landscape plan, completed in 1882 by Miller and Yates, Landscape Gardeners of Philadelphia, also provided for specialized teaching and research needs of the college. This plan included forty-seven collections and features.

Change and expansion of the university created a need for more arboretum space. In 1939, Professor Leslie Hancock proposed a plan for a small arboretum near Watson Hall. There followed a series of proposals, put forward by Dr. R.J. Hilton, Professor V. Chanasyk and Professor F.H. Montgomery, concerning the need for an arboretum. These proposals led ultimately to the formation of the Arboretum Study Committee in April, 1964. At this time, the university was on the threshold of a period of rapid expansion. There was clearly a need for a permanent arboretum site. At the same time, the range of potential uses for such a facility had become more numerous and complex.

In 1966, the Board of Governors approved in principle the concept of establishing an arboretum as a "living laboratory", and allocated funding for preliminary investigations and research. The Academic Brief submitted by the Arboretum committee in June, 1968 detailed the role of the arboretum in research and education. Arboretum facilities and collections would support needed research in woody plan adaptation and management and teaching of graduate and undergraduate courses in Botany, Horticulture and Landscape Architecture. An arboretum site at Guelph was considered particularly valuable for research, because, in the region, it represents a climatic zone significantly different than that of arboreta at Ottawa and Hamilton. The present site was recommended because it had the potential to fulfill the function of a "living laboratory" for a range of disciplines and uses. The site was readily accessible to the campus, possessed a wide variety of soil types, topographic and microclimate characteristics. There was also a variety of existing woody plant material.

The Master Plan for the Arboretum culminated three years of work by the Arboretum committee under the chairmanship of Professor Victor Chanasyk. Professor William Coates, Landscape Architecture, acted as consultant. In November, 1970 the University Board of Governors approved the Master Plan.

The Master Plan designated 25 separate collections. Also included were several specialized research and study areas, including gravel pit rehabilitation, woodlots, water features, framework plantings, and natural wooded preservation areas. Development of collections was to be concentrated in the central and north blocks. The Southwoods area was designated as primarily an unmanaged research area.

Development of facilities and collections commenced in 1970, and concentrated on the "living library" concept of the Arboretum. Nursery and Service Centre facilities were largely completed in 1972. In the spring of 1974 OAC Centennial Arboretum Centre was officially opened. The opening of the J.C. Taylor Nature Centre in 1978 provided a focal point for the growing interpretive program.

More of the major events and programs that were initiated during the following years of growth are highlighted Appendix A.

2.0 GOALS AND OBJECTIVES

The University of Guelph Arboretum is a separate multi-use resource unit that initiates, supports and integrates teaching, research and service relative to the needs of the University, the international scientific community and the general public.

AIM

The Arboretum focuses on excellence in the following areas:

a) World conservation of woody plant materials.
b) Collection of Ontario species of Carolinian flora.
c) Record systems that provide a comprehensive data base for significant research and teaching.
d) Environmental education in support of University and public nature interpretation programmes.
e) Teaching collections and demonstrations in horticulture, botany, landscape architecture and forestry.
f) Specific research areas that are responsive to species improvement, conservation and other identified needs in Ontario.
g) A programme of propagation, evaluation, selection and introduction of woody plant material.

The following Goals and Objectives have been established to accomplish the stated Aims of the Arboretum.

1. GOAL

To serve as an EDUCATIONAL facility for the University.

OBJECTIVES

a) Provide a major, representative collection of identified woody plants of the temperate zone with specialization in the genera native to southern Ontario.

b) Develop demonstration areas that illustrate principles in plant material use, design and maintenance.

c) Maintain a programme of plant labelling for identification and inspection purposes.

d) Maintain a resource room and herbarium for reference purposes.

e) Retain a resource staff for teaching and liaison with University academic units and the public.

f) Maintain on-site areas of natural vegetation as a resource for ecological education.

2. GOAL

To serve as a research facility for the University, the greater scientific community and industry relative to taxonomy, species improvement, ecology, environmental education and the conservation of woody plants.

OBJECTIVES

a) Establish and maintain a major botanical collection of native and exotic woody plant material with special emphasis on genera of the Carolinian flora found in southern Ontario.

b) Develop a record-keeping system that compiles comprehensive data relative to specific plants, spatial information on biophysical conditions and as-built drawings.

c) Establish and maintain a gene bank of native, rare and other significant woody plant material for conservation, research, exchange and plant development purposes.

d) Participate in international plant conservation and seed exchange programs.

e) Maintain an acquisition policy that supports research objectives.

f) Conserve significant on-site unmanaged natural areas that may serve as outdoor laboratories for biological and interpretive research.

g) Retain research and support staff to initiate and assist in the liaison and conduct of research activities in the arts, sciences and the humanities.

h) Promote the availability of Arboretum resources to the research community.

i) Maintain a resource room and woody plant herbarium for research purposes.

3. GOAL

To provide a SERVICE to the University, the City of Guelph, appropriate interest groups and the general public.

OBJECTIVES

a) Provide nature interpretation facilities and educational programmes for the public.

b) Maintain a high standard of aesthetic quality in the development of plant collections and support facilities.

c) Accommodate cultural programmes and meetings that are compatible with the Goals and general character of the Arboretum.

d) Incorporate horticultural displays, sculpture and other art forms that are complementary to the Arboretum Master Plan.

e) Accommodate passive recreational uses that are compatible with other uses and facilities.

f) Create a facility of general significance and interest for visitors to the Guelph area.

g) Develop a barrier-free environment which is accessible to everyone.

h) Establish and maintain an outreach program that encourages an appropriate level of public involvement and support.

3.0 USER GROUP NEEDS

3.1 INTRODUCTION

The institution of the present University of Guelph has, for close to 100 years, recognized the importance of an "outdoor laboratory" to service educational activities in the natural sciences. This was a recognized important need in the initial planning of the original OAC campus and more recently in the planning and development of the University Arboretum during the 60's and 70's.

Significant changes in the needs of the various users of Arboretum facilities and resources have occurred over the past fifteen years. Recognition of the magnitude of these changes prompted the Steering Committee to complete surveys of academic, non-academic and public needs through solicitation of information via questionnaries and correspondence. The procedures, results and discussion of these solicitations are contained in the following section and in the Appendix B.

3.2 ANALYSIS OF USER NEEDS SURVEYS AND MEETINGS

3.2.1 PROCEDURES

Information on the appropriateness of the drafted Arboretum Goals and Objectives plus the adequacy of the existing resources and facilities of the Arboretum was solicited in November 1985 from the Deans and Directors of the following: The Ontario Agricultural College, the Ontario Veterinary College, the College of Arts, the College of Biological Science, the College of Social Science, the Faculty of Graduate Studies and the School of Part-time Studies and Continuing Education (Appendix B-1). Soon after a questionnaire was circulated to all faculty and staff of the University which asked for a response to similar questions (Appendix B-2). A more general solicitation was directed to the students of the University, also, in November 1985 (Appendix B-3). Shortly following this, a letter requesting comments on the Arboretum Goals and Objectives and existing facilities and resources was sent to members of the Arboretum Advisory Committee and those individuals and agencies in the community who have had prior contact with the Arboretum (Appendix B-4).

Coincident with the above mentioned surveys, members of the Arboretum Steering Committee met with Department Chairmen and School Directors plus those faculty with interests and/or involvement in the Arboretum including: Botany, Zoology, Environmental Biology, Horticulture and Landscape Architecture. The agenda of each meeting centred on the

specific comments of each faculty relative to their opinion of the draft Goals and Objectives and their perception of the strengths and shortcomings of the existing Arboretum resources and facilities. In January 1986, a similar meeting was held with Arboretum technical and professional staff to gain from their direct experiences in day to day operations.

3.2.2 RESULTS

Responses of Deans and Directors

In general the responses were supportive of the draft Goals and Objectives. However, the issue of the Arboretum becoming an academic unit was not supported. It was suggested that such a change would have to be assessed in competition with other priorities for funding.

Other comments dealt with the importance of increasing the role of the Arboretum in teaching and research. It was suggested that an individual or small group be charged with promoting increased use of the resources and facilities.

It was pointed out in a few instances, that the use of the Arboretum by particular colleges were limited solely to attendance at meetings and seminars at the OAC Centennial Arboretum Centre. Continued availability of this facility was encouraged.

Response of Faculty and Staff to the Questionnaire

Question 1. Do the draft "Goals and Objectives" of the Arboretum define an appropriate role for the facility in the University and community?

The majority of both faculty (81%) and staff (83%) found the draft Goals and Objectives defined an apporpriate role for the Arboretum (Table 1). Concern was expressed about Goal 2 which suggests that the Arboretum be changed in status from a resource facility to that of an academic unit. The small number of existing professional staff and the strain on university resources at a time when these resources are limited were cited reasons for leaving the status unchanged.

Another important issue raised was a preceived lack of emphasis in the Goals and Objectives on the use of the Arboretum in the academic teaching program and in research.

Some concern was expressed about the future status of "unmanaged" areas within the Arboretum. It was suggested that such areas be retained indefinitely, without management or disturbance, to be used as field laboratories for academic course instruction and for public education in nature interpretation.

Question 2. Do you regularly visit the Arboretum and, if so, what is the purpose of your visits?

Most faculty (83%) and staff (74%) visit the Arboretum on a regular basis (Table 1). The purposes cited included: attendance at meetings in the Centre, for instruction of academic courses, for on-site research, to walk or jog on Arboretum trails and visits in association with evening and week-end programs for adults and children in nature interpretation.

Comments on this question were varied. Many complimentary comments centred on the merits of public education in nature interpretation and liaison with regional schools with respect to environmental education. Some suggested that the Arboretum would benefit from greater involvement of plant-oriented faculty from academic departments in the public education programs.

Overall, the comments reflected a general lack of knowledge on the part of both faculty and staff about existing Arboretum facilities and resources and their accessability for teaching and research.

Question 3. How can the Arboretum staff and facilities support your needs?

One half of the faculty respondents (49%) suggested that the Arboretum could help in their academic teaching and research programs (Table 1). It was recommended that the Arboretum could provide an outreach program for the public by providing information on trees and shrubs and their use in the landscape. Another suggestion was for increased use of the Centre facilities by a wide clientele, without restriction to Arboretum-associated functions.

Some respondents felt that the Arboretum is too distant from the campus to be used effectly in teaching. It was suggested that a bus-shuttle service would overcome this shortcoming.

Question 4. Do you presently, or in the future, expect to need facilities or resources which should be provided by the Arboretum?

Almost half of the faculty (48%) presently, or in the future expect to need facilities or resources of the Arboretum (Table 1). A smaller proportion of the staff (36%) felt they would have such needs.

Many respondents indicated a present or future need for the Centre facilities. Others cited present or future need for non-woody collections such as a collection of herbaceous, native woodland plants.

Several comments contained both the faculty and staff surveys addressed the issues of the role of the Arboretum in teaching and research. Some suggested that the Arboretum should be more academic in its activities if it is to serve as an education resource for plant-oriented departments. Other comments recommended closer ties between the academic departments and the Arboretum to strengthen the teaching role of the Arboretum.

Comments on the Arboretum's role in research suggested increased integration through cross-appointments of faculty and professional staff of the Arboretum. An increased role in research in specific areas was suggested, including, taxonomy, woody plant ecology and applied forestry.

Positive comments were made about the role of the Arboretum in improving University and City of Guelph relations through its public programs in nature interpretation.

Negative comments centred on the inappropriateness of the change in status of the Arboretum from a resource unit to that of an academic unit. Some found the regulations on Centre use were too restrictive.

The possibility of the Arboretum providing consultation services to the public was mentioned and the advantages of periodically publishing a newsletter in improving communications with the public was discussed.

Department and School Meetings

The department meetings with Environmental Biology, Horticulture, Botany, Landscape Architecture and Zoology raised a number of issues. Those discussed included the following:

i) The Arboretum should develop new policies to foster cross-appointments of faculty from the various departments. New faculty might have an assigned involvement with Arboretum at the time of appointment.

ii) The Arboretum needs a focus in research. It was suggested that the Arboretum foster the development of "Councils on Research" to coordinate the various research interests. Examples of increased research involvement were in forest genetics and agroforestry.

iii) For the Arboretum to become more than a facility, the administration should be changed to be the responsibility of the Vice President Academic. The suggestion that the Arboretum become an academic unit was supported in some instances and discouraged in others.

iv) Research funding was discussed and a suggestion was made to seek "seed" funding from the President's Special Fund.

v) Location of the University Herbarium was discussed in two meetings. Some felt that it should be housed in the Arboretum. Others, having immediate involvement, point to its need in research and, hence no change in housing should take place.

vi) A problem in use of Arboretum resources in teaching was related to the distance to these resources and the limited time that students have between lectures and laboratories.

vii) Two suggestions were made to amalgamate university owned woodlots under the Arboretum.

viii) Educational programs such as an "internship" at the Arboretum were suggested to need good supporting arguments since other institutions are involved in this type of endeavour. A strong argument for such a program was the strength of the University of Guelph in the Plant Sciences.

ix) The Arboretum needs to monitor its collections and record data on the performance and success of individual specimens.

x) Mechanisms need to be developed to ensure the implementation of the Arboretum Goals and Objectives.

xi) The Arboretum needs a policy regarding the inclusion of art objects and use of areas for recreation.

xii) The Arboretum needs a long term commitment regarding the permanency of its properties.

xiii) The importance of design was emphasized with regard to the development of collections and demonstrations.

xiv) Auxillary groups such as "Friends of the Arboretum" could make a significant contribution to finances and operations of the Arboretum.

xi) The Arboretum needs to foster regular meetings with academic department users to improve and maintain communications and involvement.

Survey of Community Agencies and Individuals

Community responses were concerned with two basic Arboretum functions which involve the public. Firstly, is the educational program in nature interpretation used by the public and in particular, the schools in the city and region. Invariably, the respondents were very complimentary about this function. Obviously the Arboretum is fulfilling an important need in this regard and should foster its continuance. Several comments were supportive of the role of the Arboretum in the conservation of woody plants. Others suggest a strengthening of the public education program.

Secondly, the Arboretum Centre facility is used by various agencies both from within and external to the University. Respondents were grateful for their past use of the Centre and were hopeful that their use could continue.

3.2.3 ISSUES IDENTIFIED

Many issues that impinge on the development of a new Master Plan for the Arboretum were commented on and/or discussed in the questionnaire and meetings. Some were consistent between the groups involved while others were opposing. It is the intent of the following to highlight the issues through a series of statements. Each statement is qualified by a brief discussion.

Statement 1.
The Arboretum should consider a change in the University administrative structure so that it becomes the responsibility of the Vice President Academic.

The Arboretum, historically, and at present, is administered by the Dean of the Ontraio Agricultural College. However, a change in administration is appropriate since the Arboretum is a "University facility".

Statement 2.
The Arboretum should have its status changed from that of a University resource unit to that of an academic unit.

Supportive arguments for the Arboretum becoming an academic unit include, recognition of Arboretum professional staff as equivalent to faculty in terms of career development and, acceptance of the professional status of Arboretum staff by research granting agencies external to the University.

Arguments against a change in status are that the existing professional staff are too few to constitute a viable academic unit and, that the current financial constraints faced by the University preclude any further dilution of its financial resources.

Statement 3.
The Arboretum should foster an increase in use of its collections and demonstrations in academic teaching.

The existing use of Arboretum resources in academic teaching is largely related to the use of unmanaged areas and small water bodies as "field laboratories" in courses in Environmental Biology, Botany and Zoology. The Arboretum professional staff are involved in teaching a number of these courses. Now that many of the woody plant collections are of sufficient size and of verifiable stock, they offer a significant resource for those academic courses that deal with woody plants. Consideration should be given to making more extensive use of these materials.

Statement 4.
The Arboretum should ensure that new collections or demonstrations are developed in accordance with an overall design objective.

New collections or demonstrations should be incorporated into the Arboretum by following designs which fit into an overall design objective.

Statement 5.
The Arboretum should ensure that the existing unmanaged areas and small water bodies remain undisturbed.

Tracts of unmanaged areas and small water bodies, within the Arboretum, have been and will continue to be used extensively by academic teaching programs and for public education through the nature interpretation program. As such they represent a valuable, well used resource for the University and community which is essentially cost-free in terms of maintenance. Consideration should be given to retaining them indefinitely in their present condition.

Statement 6.
The Arboretum is making a useful contribution and should continue to offer its public education program in nature interpretation.

Comments on the existing nature interpretation program at the Arboretum were, invariably, complimentary. Enhancement of this program might be possible through involvement of faculty from academic departments on campus.

Statement 7.
The Arboretum should consider support and provide resources for a public education program on arboriculture and woody plant propagation.

A companion program to the nature interpretation program might be organized along similar lines, in arboriculture and propagation, and be another important link to the community at large. Presumably, such courses could be offered through the School of Part-time and Continuing Education and taught using the existing Arboretum staff and, possibly, faculty from the various academic departments.

Statement 8.
The Arboretum should investigate the potential for an "internship" program, and if feasible, implement such a program.

A internship program in arboriculture could provide practical working experience for those people who have completed technical training programs in various plant-oriented disciplines. The program could be supported by regular instruction on "field" procedures by Arboretum professional staff and departmental faculty. Such a program would benefit from the University's strengths in the plant sciences. Supportive funding could be solicited from the Ontario Ministry of Agriculture and Food.

Statement 9.
The Arboretum should determine mechanisms that will overcome the distance/time problems faced by academic teaching in getting to and from the Arboretum resources.

At present some teaching faculty are unable to make use of the Arboretum resources because of the limited time available between classes and the time needed to travel to and from the resources. Practical solutions to this problem should be investigated, e.g. through changes in time slotting of courses and possibly through design considerations.

Statement 10.
The Arboretum should design policies and mechanisms that promote research on woody plants in the Arboretum.

Existing research endeavours include those which are: internal to the Arboretum, cooperative between Arboretum professionals and faculty and those conducted independent of the professionals by faculty but which utilize Arboretum properties. All three types are likely to continue but those conducted by Arboretum professionals and the cooperative research could be fostered by the Arboretum. Possible areas of involvement would include, taxonomy, woody plant ecology, landscape design and planning, perservation of rare and/or endangered species and agroforestry. "Councils on Research" might be made up of those whose research interests are similar, to organize and coordinate the research.

Statement 11.
The Arboretum should identify appropriate research programs and investigate funding sources to support these programs.

The Arboretum should foster the development of research programs and seek financial support for them. "Seed" funding might be available through sources such as the President's Special Fund.

Statement 12.
The Arboretum should develop mechanisms to increase the integration of teaching and of research between the various plant-oriented departments and the Arboretum.

Improved integration could be completed if various mechanisms were implemented. For example, new appointments could have an Arboretum assignment in teaching and research, funding of research might be supported through a contingency for Arboretum involvement and, increased involvement could result from increased and regular communications between the academic departments and the Arboretum.

Statement 13.
The Arboretum should investigate various options for the development of cooperative arrangements for, and development of the University Herbarium.

Comments, both pro and con, for moving the Herbarium to the Arboretum were voiced in the surveys. Such a change may not be appropriate but improved cooperative arrangements might be implemented which would integrate the present herbaria in Botany and the Arboretum, e.g. they might be jointly administered.

Statement 14.
The Arboretum should implement a program to monitor and record data on individual specimens within each of its collection.

A practical program of evaluation of individual specimens could form a valuable data base for arboretum professionals and those faculty concerned with the success of particular species.

Statement 15.
The Arboretum should consider the feasiblity of assuming responsibility for University owned woodlots.

Although assuming responsibility for the woodlots may be a reasonable suggestion, it should be considered in light of the additional strain on Arboretum resources and the time of its professional staff.

Statement 16.
The Arboretum should consider the feasibility of becoming an International Centre for Agroforestry.

It has been suggested that an interdisciplinary group of researchers be formed at the Unviersity to be composed of those whose research interests are in the area of agroforestry. Also, it has been suggested that the group be centred at the Arboretum (A.M. Gordon. Development of an Agroforestry Program at the University of Guelph. Report to the Dean, O.A.C. January 20, 1986).

Statement 17.
The Arboretum should develop policies and mechanisms to ensure that the "Goals and Objectives" are implemented in the future.

The function of the Goals and Objectives could be lost if appropriate policies and mechanisms are not in place to ensure their implementation.

Statement 18.
The Arboretum should obtain official approval of the University for its Master Plan and Goals and Objectives.

It can be anticipated that urban development of Guelph will soon encroach upon those University boundaries which are occupied by the Arboretum. Also, the University, at some future date may wish to sell portions of its properties. In either instance, the Arboretum should have firm assurance that there will be no losses of collections and properties through official approval of its Master Plan and its Goals and Objectives.

Statement 19.
The Arboretum should consider existing policies regarding the inclusion of art objects on its properties and the uses of its resources for various types of cultural activities and recreation.

The existing policy should be re-evaluated to develop a policy which would enable assessment of the appropriateness of inclusion of art objects and the kinds of cultural activities and recreation uses for the Arboretum.

Statement 20.
The Arboretum should reconsider the feasibility of developing an auxillary public support group such as "Friends of the Arboretum".

A public support group could make a significant contribution to finances and operations and also form a link between the Arboretum and the community at large.

Statement 21.
The Arboretum should consider the feasibility of including non-woody plants in its collections.

It is quite feasible that collections of certain herbaceous plants, e.g. native woodland species, could be incorporated into some collections of woody plants.

Statement 22.
The Arboretum should consider the administration and current policy regarding the utilization of the Arboretum Centre.

Comments on the use of the Centre emphasized the popularity of this facility. Also, several persons suggested that the use be made less restrictive.

Table 1. Questionnaire Responses from Faculty and Staff.

Question 1. Do the draft "Goals and Objectives" of the Arboretum define an appropriate role for the facility in the University and community?

	Yes	No	Unanswered
Faculty	81	13	6
Staff	83	15	2

Question 2. Do you regularly visit the Arboretum and, if so, what is the purpose of your visits?

	Yes	No	Unanswered
Faculty(1)	83	17	0
Staff(2)	74	26	0

(1) Major reasons cited; meetings in Centre, education, for childrens programs, research and recreation.

(2) Major reasons cited; meetings in Centre, recreation, nature interpretation.

Question 3. How can the Arboretum staff and facilities support your needs in research and education?

	Yes	No	Unanswered
Faculty	49	48	3
Staff	not applicable		

Means of support cited; reseach for specific interests, education for adults and children, for University courses, recreation (University and Community).

Question 4. Do you presently, or in the future, expect to need facilities or resources which should be provided by the Arboretum?

	Yes	No	Unanswered
Faculty	48	10	49
Staff	36	50	14

Major needs cited; Arboretum Centre facilities, collections and unmanaged areas in research and teaching, meteorological data from the Arboretum weather station.

3.3 ISSUES RESOLUTION

The Steering Committee, in considering the forementioned statements arising from the User Needs Surveys, grouped the issues in four categories including:

1) Administration and Management,

2) Research, Academic Teaching and Public Education,

3) Planning, Design and Resource Conservation, and

4) Public Support.

The Steering Committee made the following decisions which provide guidance for policy and design:

3.3.1 ADMINISTRATION AND MANAGEMENT

Encouragement to Use Arboretum Facilities
The Director shall provide information on available Arboretum resources to concerned academic units in the University with the aim of encouraging the appropriate use of the Arboretum in University teaching. In support of distributing information, the Director shall arrange regular meetings, seminars and interdisciplinary activities. The Director may establish an advisory committee or identify specific contact personnel to facilitate the flow of such information.

User Policy of The OAC Centennial Arboretum Centre
The policy on this matter requires no adjustment at this time. The use of the Centre by authorized user groups has proved satisfactory.

Special Collections of Non-woody Plants
Non-woody plant material would be best incorporated either into the unmanaged areas or into the context of the woody plant collections. Special collections of this type are not central to the mandate of the Arboretum and, for this reason, such collections have a low priority. There is agreement that an 'Old Field' area(s) would be retained since it contains an essential woody plant component. Other collections, such as 'Tall Grass Prairie', are inappropriate and might be better located at a Horticultural Research Station.

The Herbarium Resource
The hebarium at the Arboretum serves three basic functions, containing specimens from 1) collection plants (and plants grown in the nursery that were not deemed suitable for collection plants); 2) natural areas within the Arboretum; and, 3) field studies on native rare trees and shrubs, or other species from which seeds were collected for the Index Seminum distribution.

University Woodlots
The management of University-owned woodlots which are external to the Arboretum lands shall not be assumed by the Arboretum at this time. The reasons for this are as follows:

1. There is no funding for this management task and hence, no expertise available for this task.

2. This responsibility would not seem to be central to the stated goals and objectives of the Arboretum.

3. The possible uses and interests in these lands, such as studies and agroforestry practices, require an administrative model that represents all such interested users. This is not compatible with the Arboretum management process.

Agroforestry Orientation
The Arboretum will not undertake, in addition to its stated responsibilities, the role as a Centre for Agroforestry. The limitations on funding, space and personnel preclude this possibility. The merit of creating such a Centre is realized and it is also recognized that input from Arboretum personnel would be valuable to such a project.

3.3.2 RESEARCH ACADEMIC TEACHING AND PUBLIC EDUCATION

Research Policy and Promotion
An advisory committee on research shall be established and shall report to the Director of the Arboretum. Its main task will be to approve, review and promote high quality research at the Arboretum. This committee will be comprised of representatives from the Departments of Botany, Horticulture, Zoology and the School of Landscape Architecture.

A policy will be drafted for Arboretum based research proposals. The policy shall make a clear statement regarding the funding of research and the establishment of a research review process. It shall set out guidelines for the use of Arboretum resources and provisions for any special administrative and maintenance considerations. The report shall propose ways of encouraging joint research projects with Arboretum staff.

A policy for inhouse research will also be drafted.

Academic Teaching and Educational Aims
There shall be an overall encouragement of interdisciplinary instructional activities at the Arboretum. The concept of appointments of personnel jointly from the University proper and the Arboretum is to be fostered. The Arboretum research committee shall be instrumental in attending to the education aims of Arboretum research.

The distance and time constraints for the use of the Arboretum as a instructional location shall be minimized. The updated Master Plan shall locate any special 'teaching collections' as close to the campus as is feasible.

Internship Programme
The Arboretum Steering Committee has been exploring the potential for an Internship programme. The feasibility of this programme is a matter to be further explored by the new Director of the Arboretum.

Public Programmes in Nature Interpretation
Current levels of service shall be maintained by the Arboretum as a public service programme of the University.

Public Education in Arboriculture and Woody Plant Propagation
The Arboretum shall consider the feasibility of developing and supporting public educational resources for instruction in arboriculutre and woody plant propagation. The possibility of establishing programs cooperative with other Continuing Education programmes at the University shall be investigated.

3.3.3 PLANNING, DESIGN AND RESOURCE CONSERVATION

Overall Design Objectives
The updated Master Plan shall include a list of design objectives that will establish principles of future Arboretum development.

Conservation
Existing unmanaged areas of the Arboretum shall be preserved in their natural state. Such areas as Victoria Woods, Wildgoose Woods and South Woods, shall be made available for nature interpretation, environmental education and compatible research.

Art Works and Sculpture
The Master Plan shall identify the possible suitable locations for art works at the Arboretum.

Public Presentations and Music Concerts
The current policy related to public concerts shall be maintained. Such gatherings are not in conflict with the goals and objectives of the Arboretum nor with other Arboretum uses.

Seating and Other Site Amenities
The Master Plan shall set design standards for benches and other such site equipment.

3.3.4 PUBLIC SUPPORT

Development of a Public Support Group
From time to time, there shall be an investigation of the possibility of establishing an auxiliary public support group. Currently, there are approximately one hundred 'Arboretum Associates' who have become involved largely through their interest in Arboretum nature interpretive programmes. These people have made contributions to the facility and are on current mailing lists. When numbers of potential supporters warrant the establishment of an auxiliary public support organization such as 'Friends of the Arboretum', the 'Arboretum Associates' could be seen as a nucleus to its development.

3.4 SYMPOSIUM

On January 11, 1986, an Arboretum Planning Symposium was held at the University of Guelph Arboretum. The products of this symposium of direct relevance to the Master Plan Review have been assembled here. Recommendations are not recorded in the order they were given but have been placed in the following categories of concern: Administration and Management; Research, Academic Teaching and Education, Public Education; Planning and Design, Resource Conservation; and Public Support. Papers submitted by the symposium participants are available.

3.4.1 ADMINISTRATIVE AND MANAGEMENT CONCERNS

One of the most obvious features of the Arboretum is its university context. The alliance with the University of Guelph, whose dominant strengths are the life sciences, the arts and the pure sciences respectively, must have a substantial impact on the direction of Arboretum development. There are many coincidental interests and potential disharmonies that may develop as a result of this alliance. These should be identified and brought into a formal aims document, such as the Master Plan, in a constructive pattern that benefits both the Arboretum and the University.

Roy L. Taylor, President of the Chicago Horticultural Society, undertook at the symposium to consider the ramifications of the alliance between a university and a botanical garden or arboretum. In his view, an arboretum's origin is an important point that establishes a primary and lasting relation to the sponsor organization. Since the initiative of the university community was the parent of the University of Guelph Arboretum, there is a natural focus of attention upon this crucial relationship. The impact of this upon Arboretum functioning is substantial as Taylor notes:

> The programs developed by the botanical garden/arboretum are perceived on one hand as representing the university, whereas on the other hand, the programs must be subject to

> the scrutiny of the research and educational community within the university. The botanical garden/arboretum must establish programs that can withstand the critical review of both reviewers and users.

Taylor insists there must be a frequent flow of important information between university and arboretum personnel if the arboretum is to gain the full respect and privileges of a university associate organization. The opportunities for research for both arboretum and university based personnel must be first recognized and then maximized by arboretum management. Such research opportunities are not restricted to the traditions of scientific research. Rather, in Taylor's experience many harmonious and productive uses of the arboretum can be made by non-scientists. Creative writing, film production, and the visual arts are examples of alternate conceptions of research that may be profitably accommodated. Taylor's general recommendation here is that arboretum management take a great interest in accommodating and building on the changing needs of arboretum users. This approach maximizes support both monetary and attitudinal for the ongoing vitality of the arboretum.

In aiming to satisfy the users of the facility, whether actual or potential, the arboretum management must focus on its situation within the university community. The funding process is, of course, critical in this respect. Taylor argues that an arboretum in the university context must have a maximum of financial and administrative autonomy so that it is free to conduct its funding matters as a separate academic unit of the university. An arboretum budget committee should conduct its own internal review and set forth responsibly its recommendations to the central university administration for approval. It is possible, says Taylor, in this way to avoid the inclusion of arboretum financial affairs in an inevitable autocratic 'fiefdom' which does not necessarily review or respond to the needs of the university in the way the arboretum review committee may. Hand in hand with such autonomy goes a firm responsibility to the university to serve its formally stated goals and objectives. The allegiance of an arboretum to such objectives, in Taylor's view, are primarily expressed through the form and quality of arboretum programs.

These comments on the allegiance to the stated goals and objectives of the university are timely since these have been recently articulated by the University of Guelph. The aims document, Towards 2000: Challenges and Responses, would appear to have significant impact upon the management of the Arboretum no less than upon other University departments. Some elements of this document have great implications for the direction of the future development of the Arboretum and for the expectations of quality in its programming. The administration and management concerns of the Arboretum must, in essence, coincide with the concerns of this aims document.

Finally, it is critical that those whose work it is to operate the Arboretum have a clear concept of the unique qualities of the Arboretum as a University facility. An arboretum is an academic support unit, similar to the university library. Whatever status it attains to in

actuality, as a whole it is a duly constituted body with expressed responsibilities. It is a permanent, not a transient fixture where it exists and it cannot be dismantled and set in operation again at will when circumstances are favourable. The individuals whose concern it is to manage the Arboretum must have a clear appreciation for the unique opportunities available for learning at a university arboretum.

3.4.2 RESEARCH, ACADEMIC TEACHING AND EDUCATION, AND PUBLIC EDUCATION

This group of concerns was well represented in the symposium, both in the papers presented and in the general discussion afterwards. There was a general desire to define the role and importance of research at arboreta. Some participants wished to place research as the predominant purposeful activity, whilst others recognized the dominance of the non-research purposes such as the fostering of awareness of the natural environment among the public. It would appear that any attempt at the subordination of the research function was overruled by the majority of the informed participants. It may be observed, for example, that an arboretum, while being an excellent public instructional vehicle, does not have a monopoly on the awareness of its subject matter. But an arboretum does provide unique forms of research opportunity that cannot otherwise be secured.

Frank Santamour Jr. posed the fundamental question concerning the very concept of an arboretum: "When does a bunch of trees become an Arboretum?" The question properly aims at the essential ingredients that an arboretum must possess. It is Santamour's view that this essence is scientific research. Without it, a facility cannot conform to the traditional meaning and purpose of an arobretum. Research objectives cannot be compromised without thereby compromising the excellence and value of the arboretum as a whole. Through research, an arboretum first gains and then retains national and international stature. Research funding can be very scarce, admits Santamour, but nevertheless it must be relentlessly pursued. Though financial resources are always hard to come by, the channelling of funds into research is always profitable in the long term. Santamour's message to support and promote research activity as the major purpose of an arboretum was clearly and boldly stated during the symposium.

The traditional purpose of botanical gardens and arboreta has been researched into the origin and constitution of flora and to a lesser degree fauna. The modern view is that we cannot study living entities in isolation from their respective environments. The traditional concepts of the method for identifying and cataloguing species, a primary activity of early arboreta, has lately shifted to include an investigation of the genetic constituents of individuals. As well, the advent of tissue culture and microtechnology has supplied the taxonomist with new tools for his investigation. It was speculated at the symposium, that in a few years, the taxonomist may replicate the genetic constitution of preserved herbarium specimens in order to aid in positive classification.

The role of genetics in the modern arboretum is having great impact on the very concept of some traditional arboretum functions. Dr. Peter Ashton's paper, The Biological Considerations in situ versus ex situ Plant Conservation, contained many valuable insights into the role of the twentieth century arboretum. He drew attention to a central fact which has enormous implications with respect to plant collections: Ex situ cultivation is in no measure a substitute for in situ conservation. The conservation measures that plant collections are frequently meant to embody cannot succeed since the maintenance of adequate genetic representation and the simulation of natural selection processes are not possible in ex situ plantings. The value of ex situ collections falls far short of a realistic long-term conservation of taxa if the aim is to conserve genetic representation in a taxon. Ashton considers it a critical role of arboreta to manage plant genetic resources by lobbying and educating for the protection of these resources as they exist in situ. Ashton's presentation illuminated the potential for misunderstanding of the word 'conservation'. Conservation in the sense of conserving genetic stocks is, in Ashton's view rendered illegitimate in any absolute or static sense -- one may only conserve a particular evolving, changing community of individuals in situ. This very qualified sense of conservation must not be identified with the conservation of natural features and biotic resources that usually occurs when an arboretum occupies a particular site. These features are conserved mainly for their practical or aesthetic value since the provision for creating in situ environments is such a remote possibility for more than a few species.

Ashton's discussion of the serious limitations placed on ex situ conservation aims focuses attention upon the purpose of plant collections. Firstly, there are many important practical efforts, such as the ex situ conservation of particular heritable attributes, that botanical gardens and arboreta embrace. It is a purpose of such a facility to collect, classify and make available plant genetic information of research supportive of in situ conservation. Secondly, and in direct relation to this first purpose, botanical gardens provide the means to elevate public awareness on the serious problem of continuing plant extinctions. The enormous potential impact of large-scale plant extinctions places an educational obligation upon botanists in general and upon the educational capacities of arboreta and botanical gardens in particular. Ashton assumes that an ongoing objective of any arboretum is the preservation of world genetic plant stocks.

The academic teaching prospects at an arboretum are clearly featured in both Santamour's defense of research as the traditional function of arboreta and in Ashton's advocacy of the place of genetics in plant biological research. The opportunities of university research and instruction are obvious.

While academic teaching at an arboretum is clearly linked to research and pre-research understanding of university students, public education programs are motivated differently. While most arboreta recognize some form of duty to educate the general public, there has lately been the additional motivation of gaining public financial support by offering

educational programs. How should public education be conducted in a university arboretum setting?

Roy L. Taylor has had much experience in organizing and directing public education at the U.B.C. Botanical Garden. His views on the requirements of public education programs were presented carefully to the symposium. In educational offerings, the arboretum should take care that its public programmes have a strong relation to the accepted standard of a university educational program. Taylor warns that care should be exercised to insure that any program offered represents a challenging and rewarding educational experience appropriate to the university's goals and objectives. Obviously there is a delicate balance to be maintained between such objectives of quality and the objective of reaching a wide public audience for arboretum programs. Taylor's comments in this regard expose the responsibility that the arboretum shares with the Office of Continuing Education at this University in maintaining high quality educational programmes. The difficulty and rigor of the course offerings attracts highly interested participants who are most likely to build productively on their knowledge and become enthusiastic supporters of the educational facility. Such participants will not be attracted by a low quality educational experience with low expectations of them.

3.4.3 PLANNING, DESIGN AND RESOURCE CONSERVATION

The physical character of an arboretum is in constant flux since its plantings and even the character of the grounds are constantly changing. The planning and design processes are therefore an ongoing activity in arboreta both for this reason and for the reason that user needs change.

Mai Arbegast, Landscape Architect, discussed the manner in which the planning and design process should proceed. Primarily, it is the obligation of the arboretum management board to communicate its needs to the planning staff. Much of the discussion of the symposium, for instance, is information that can be interpreted and applied in spirit to the planning process by a competent professional. A clear and direct communication of the arboretum requirements to the planner will ensure that the intentions embodied in the plan and the effects of its acutal implementation will be consistent with long range aims of arboretum management.

In practice, landscape planning takes into account the merits of a site prior to the intervention of design inputs. The desirable features of the site are retained, in a sense they are conserved, by the planning staff. The requirements of the design program are applied to the site mindful of the attributes to be conserved. It is required that the arboretum management express its opinion on the evaluation of particular existing features on site during the planning process so that these may considered.

3.4.4 PUBLIC SUPPORT

Programs of an arboretum that attract and involve non-university people tend to generate popular support for the facility in the larger regional community. This support may translate into financial contributions if public involvement in arboretum affairs is managed carefully and sensitively. Much of the symposium discussion of public support potential focused on both the need for high quality public programs and the establishment of a supportive organization composed of members of the interested public. Quality programming is fundamental since it will attract and retain the interest of potential arboretum enthusiasts, while membership in an arboretum association is a means through which such interest and enthusiasm may be collectively and productively expressed.

On this subject, Roy L. Taylor shared his considerable experience in directing public support programs. In his view, the development of membership programs in a university arboretum is essential to its future well being. At the University of British Columbia Botanical Garden, two separate membership Programs were initiated. The first, 'friends of the garden', was intended to provide a guiding service for those visiting the garden. It was a limited program consisting of no more than fifty members. This support group quickly developed a large number of activities including actual weeding programs in the garden when funding cutbacks created a crisis in this necessary maintenance task. More important was this group's political activities which helped dissuade the President's office from making deep cutbacks in the funding of the garden. The group initiated a plant sale to publicize the garden at the height of the threatened cutbacks. This sale has now become an annual event whose proceeds go toward the funding of garden programs.

A second membership program was initiated which was meant to provide for an endowment for the garden and to provide an opportunity for members of the public to feel part of the garden. Taylor emphasizes that an analysis was made regarding the costs of servicing an individual member and that this figure served as the basic membership fee. As a membership program will use up staff time and other resources, the membership fee must exceed the costs of these if the program is to contribute financially to the facility. This concept of a minimum membership fee is one which Taylor has seen ignored in some membership programs. At the U.B.C. Botanical Garden, categories of membership ranged from $50 to $25,000, payable annually. Each member could choose from twelve different programs at the garden or allocate funds in an unrestricted manner to general operations. Many members welcome the chance to contribute funds to a favourite garden aspect or project.

The development of effective programs for public support take time and energy. A great deal of careful strategic planning and timely 'sales pitches' through available media vehicles must be undertaken by those responsible for arboretum management. Taylor's sincere yet aggressive advocacy of the need for public support at the symposium was an example to the Arboretum project at this University. The public relations

talents of the Arboretum staff, their outgoing and aggressive stand on the issue of funding and their realization of the value of public donors, are critical to the success of a public support program.

4.0 BIOPHYSICAL RESOURCES

4.1 PLANNING CONTEXT

4.1.1 LOCATION AND ACCESS

The Arboretum is located at the east end of the University of Guelph campus as shown on Map 1. It is bounded by the Cutten Club on the north, Victoria Road on the east, University owned agricultural lands on the south, and the main University campus on the west.

The site is divided into three blocks by College Avenue and Stone Road which run east/west.

College Avenue, Stone Road and Victoria Road are all municipal arterial roads. Stone and Victoria Roads may be designated as part of Highway 24 at such time as the highway is rerouted to bypass the city core.

Public access to the Arboretum is off East Ring Road within the University campus. Municipal bus transit services are available on East Ring Road. The bus stop is slightly in excess of 1 km from the Arboretum Centre. Direct vehicular access to the Arboretum is by private automobile for individuals and by chartered bus for school, senior citizen's, and other groups.

4.1.2 SURROUNDING LAND USE AND SERVICES

The City of Guelph Draft Official Plan, dated January 1986, indicates that the zoning of the surrounding lands is varied in nature. To the north, the Cutten Club golf course and the Eramosa River valley are zoned as open space. Across Victoria Road, to the east, the lands which are presently agricultural have a proposed zoning for industrial use. The industrial development is not likely to occur in the near future as there are sizable reserves of serviced industrial land in other parts of the city. A further constraint to near term industrial development is the fact that municipal storm and sanitary sewer services cannot be extended easily into the area due to topographic conditions to the west along College Avenue and Stone Road. The same servicing constraints also apply to the Arboretum.

The mid to long term probability of industrial development is real enough to have an influence on the planning of the Arboretum. Lands to the south and west are within the University borders and as such are zoned institutional. Details of the specific land uses within the institutional zone are indicated on Map 1.

4.1.3 NATURAL AND HAZARD AREAS

The City of Guelph Draft Official Plan recognizes the wet and wooded lands which are within and abutting the southern half of the Arboretum as "hazard lands" and a "natural area".

The submission of an Environmental Impact Study would be required prior to development of these lands.

4.1.4 NON-ARBORETUM USES

Within the general area of the Arboretum, there are a number of land parcels devoted to non-Arboretum uses. These parcels are occupied by the Zoology ponds and aviary, the Grounds Department nursery and materials storage yard, and the Apiculture field lab and bee yard. The Grounds and Apiculture facilities are hidden from the view of most Arboretum visitors. The Zoology facilities, however, are highly visible from Arboretum Road.

4.2 BUILT ENVIRONMENT

4.2.1 BUILDINGS

O.A.C. Centennial Arboretum Centre
As the Arboretum's major structure, this earth-sheltered building, constructed in 1973, houses administrative, technical, information resource, and conference, facilities. The Arboretum Centre's floor area is apportioned as follows:

Auditorium	289 m^2
Resource room (herbarium, library, reading room)	130 m^2
Conference room	44 m^2
Director's office	17 m^2
Curator's office	11 m^2
Administrative office	29 m^2
Records and computer room	28 m^2
Copy room	7 m^2
Kitchen	12 m^2
Furniture storage	32 m^2
Coat room	32 m^2
Washrooms	25 m^2
Mechanical & housekeeping	48 m^2
Reception & corridors	106 m^2
Total	810 m^2

Arboretum Service Centre
This facility is a complex of structures adjacent to the Arboretum nursery on College Avenue. The service centre complex houses the propagation and maintenance facilities of the Arboretum.

The main building has two floors and contains offices, storage space, an equipment maintenance shop, and related indoor work areas, as well as a lunch room and washrooms. The total floor area is approximately 465 m^2. In addition, there are 164 m^2 of greenhouse and potting shed space, 810 m^2 of lath and shadehouses, 90 m^2 of unheated storage, plus miscellaneous hot beds and cold frames.

J.C. Taylor Nature Centre
The Arboretum's nature interpretive programmes are headquartered in this facility. The main floor consists of a 65 m^2 classroom, an 8 m^2 office, and a maple syrup evaporator demonstration area of 21 m^2. Washrooms and corridors contribute 11 m^2 to the total main floor area of 105 m^2. A partial basement provides and addition 65 m^2 of space for storage, work areas, and mechanical systems.

A 30 m^2 solar heated greenhouse is attached to the south side of the building.

Hales-McKay Memorial Shelter
This structure, near the Arboretum Centre, houses guide pamphlets, a notice board, and plaques listing Arboretum associates, donors, and supporters. There is a list of commemorative trees also.

The triangular structure, which is of concrete construction with a glazed pergola style roof and glazed front wall, is unheated and open to the elements through its two doorless entries. The area of this shelter is 60 m^2.

Houses
There are three residences on the Arboretum property. Two are old stone farmhouses located on College Avenue near the Service Centre. They are the Harrison farm house on the north side of the street and the Grant house on the south side. The third house is of frame construction, and is located at the NW corner of Stone and Victoria Roads. These houses are rented out and managed by the University and at present serve no Arboretum function.

4.2.2 ROADS AND TRAILS

Public Vehicular Access
Vehicular access for visitors is limited to use of the main paved road which runs from its intersection with East Ring Road to the Arboretum Centre area.

Arboretum Road, is approximately 1 km long and terminates in a paved 50 car parking lot. There is an additional 10 car parking area at the mid-point along Arboretum Road's length.

Arboretum Road conducts the majority of pedestrian traffic from the campus to the Arboretum, and is also used extensively by joggers, particularly in the winter season when the jogging trail is not passable.

The mixed use of Arboretum Road creates a significant safety hazard, particularly where sight distances are limited by topography in the area between the Arboretum's western border and East Ring Road.

Service Access
The Arboretum service roads are surfaced with gravel and in most cases are wider than necessary for the low volume of traffic they carry. The service roads also function as part of the pedestrian circulation system although they are not designated as footpaths. Pedestrian/ vehicular conflicts are rare due to the low speeds at which the service vehicles are operated. In total there are approximately 4.35 km of service roads in the Arboretum.

Pedestrian Circulation
Pedestrian access to Arboretum facilities is provided by a network of paths of varying surface treatment. Path surfacing ranges from gravel, as is the case with the path to the J.C. Taylor Nature Centre from the main parking lot, to mowed grass paths, within the collection areas. Interpretive trails in the wooded areas are generally surfaced with hardwood chips, with the exception of 570 m of boardwalk which is used in the wetter areas of Wild Goose woods.

Trillium Trail
This specialized 2 km long trail was developed especially for use by joggers, runners, and other fitness enthusiasts. The Trillium Trail is surfaced with stone dust and describes a roughly circular route through the central area of the Arboretum. There are ten exercise stations, which are in need of repair, spaced along the trail's length. To some extent the trail is used by other arboretum visitors whose main objective is not exercise.

4.2.3 UTILITIES

The major utility lines into and crossing the Arboretum are indicated on Map 2. Detailed drawings of the utility locations at each building may be found in the Arboretum Centre drawing file and at the University Physical Resources Department in the Trent Building on Trent Lane.

Potable water is drawn from individual wells located adjacent to each of the Arboretum buildings. Irrigation water is supplied via a 100 mm line which runs across the Arboretum as shown on Map 2.

Sanitary sewage disposal is by means of septic systems at the Arboretum Centre and the Service Centre. At the J.C. Taylor Nature Centre a combination of humus toilets and a dry well are used, however, the humus toilets do not operate satisfactorily and as a result no toilet facilities are available at the Nature Centre on a reliable basis.

Heating is provided by electric baseboard heaters at the Arboretum Centre. The Service Centre is heated by oil-fired forced air system. Most of the Nature Centre's heat energy is solar (from the attached greenhouse) with supplemental heat provided by electric baseboard heaters.

4.2.4 LAND USE

The disposition of the existing collections and related land uses was inventoried and mapped (see Map 2). Field observations, and discussions with Arboretum staff were used to evaluate the appropriateness of the existing land use components and patterns. The findings of this study are recorded below.

1. ONTARIO NATIVE TREES
   - to be deleted as a discrete colletion
   - the function of this collection is to be incorporated into the framework plantings in the form of a native tree walk.

2. STREET TREES
   - to be retained in its present location
   - could be enhanced for use as a passive recreation site e.g. picnic area.

3. CANADIAN NATIVE TREES
   - to be deleted as a discrete collection.

4. FLOWERING TREES
   - to be deleted as a discrete collection
   - an expanded list of botanic collections will include these trees.

5. FAGACEAE
   - to be retained
   - consideration of the need for suitable establishment habitat will involve minor relocation and redefinition of the collection boundaries.

6. SALICACEAE
   - to be retained in present location
   - adjustments may be made as collection composition requires change to a botanical emphasis from the horitcultural cultivars and hybrids now represented.

7. BETULACEAE
   - relocation to be considered as site is not sufficiently moist to permit successful establishment and optimum growth of some species.

8. CONIFEROUS TREES
   - to be retained in present location.

9. ACERACEAE
   - to be retained in present location
   - a need for increased area was indicated.

10. ROSES
   - to be retained in present location.

11. ROSACEAE
   - to be retained in present location
   - a need for expansion was indicated
   - there are some cultural problems to be solved related to poor soil drainage and thin topsoil on part of the collection site.

12. BERRIED TREES AND SHRUBS
   - deleted prior to this time.

13. FALL COLOUR
   - to be retained on present site
   - Existing planting plan and rate of development to be reviewed and upgraded.

14. NUT TREES
   - to be retained
   - relocation to be considered as present site is difficult for visitors to reach
   - maintenance intensity and planting plan need to be upgraded
   - a change of name to reflect the edible nature of the nuts produced is to be considered.

15 GENERAL SHRUBS
   - to be deleted as a discrete collection
   - to be combined with trees under an expanded list of botanic collections as with #4 flowering trees.

16. DWARF CONIFERS
   - to be retained in present location

17. TILIACEAE
   - the present location is suitable but may be relocated without difficulty if space required for other uses.

18. INFORMAL HEDGES
   - to be deleted as a discrete collection
   - function to be incorporated into framework plantings.

19. FORMAL HEDGES
   - to be relocated and redesigned giving the hedges a more functional appearance in a landscape demonstration setting.

20. VIBURNUMS
   - has been incorporated into #15 general shrubs.

21. LILACS
    - to be retained but relocated to a site with higher display potential and better soil drainage.

22. ERICACEAE
    - retain in present location.

23. GROUNDCOVERS
    - to be deleted as a discrete collection
    - individuals may be incorporated into landscape plantings as appropriate.

24. VINES AND CLIMBERS
    - to be retained but relocation to a site more conducive to structured display is indicated.

25. SYNOPTIC COLLECTION
    - to be retained in present location and enlarged.

26. GENE BANK
    - existing plantation location to be retained
    - additional areas throughout Arboretum to be used for expansion where planting pattern may be more naturalistic than plantation configuration.

27. GRAVEL PIT REHABILITATION
    - to be retained in present location.

28. ROBINIA
    - to be retained at present or other location
    - potential as nucleus of Leguminosae collection.

29. SOUTHWOOD
    - to be retained as a natural area as are Victoria Woods and Wild Goose Woods but with no public programmes.

30. HYBRID POPLAR
    - to be retained in present location.

31. SHERIDAN COLLECTION
    - to be deleted.

32. OLD NUT TREES
    - to be deleted

33. FORESTRY RESERVE
    - to be retained
    - consider relocation to accomodate botanical collections.

34. SPATIAL DEFINITION
    - to be deleted
    - function to be incorporated into framework and other plantings.

35. REGIONAL PLANT ASSOCIATIONS
- to be retained in present location and renamed to reflect Carolinian composition.

36. N.A.

37. N.A.

38. PERIMETER
- framework and screen plantings have high priority for establishment.

39. N.A.

40. RESERVE AREA
- to be consolidated for use as research plots.

41. ARBORETUM CENTRE PLANTINGS
- to become an integral part of framework and screen plantings.

42-49 N.A.

50. NURSERY
- to be retained in present location.

TEST PLOTS
- present trials function could be relocated if site more appropriate for other use.

OLD FIELD
- to be retained on different site that is more appropriate to its appearance.

4.2.5 HISTORY

The remnants of former use of the Arboretum property may be observed from various perspectives by the discerning eye. These features add an important dimension to the Arboretum experience. To remove or ignore them reduces interest and complexity that cannot easily be replicated. In addition to their aesthetic and humanistic value, site remnants in the form of vegetation, hedgerows or structures offer opportunities not otherwise available for scientific research which requires information of past land use and its relative stability over time.

The following section contains a brief account of the history and land use patterns of the Arboretum site. Sources used were the 1970 Master Plan, photographs and maps from the University of Guelph Archives, aerial photographs, the College on the Hill, by historian Alexander M. Ross, and information obtained from Arboretum staff. The variety of past land uses and cultural features are an important part of the research, educational and interpretive potential of the site.

The Arboretum block north of College Avenue and the greater part of the central block between College Avenue and Stone Road were part of the original 550 acre land parcel of the Ontario Agricultural College, purchased from Federick W. Stone by the Province of Ontario in 1873. The Arboretum was part of the College Farm, used by O.A.C. for test plot research and education. The remainder of the cental block was purchased by the University in 1965. The north edge of Wild Goose Woods is the approximate location of the north boundary of this parcel. At the time of purchase, there was an assortment of houses, barns and sheds on this land, on fourteen lots ranging in size from under one acre to over twenty acres. Several of the buildings that were surplus to University needs were removed. Use of this area is now shared by the Arboretum, Grounds Department, and Environmental Biology (Apiculture).

The Pagani property, now Southwoods, was also acquired by the University in 1965. At the time of purchase, this land was pasture and wood.

Historic Site Features
There are two stone houses on the property. Grant House and the Harrison Farm House are located adjacent to College Avenue. Both are significant historic and visual features that should be sensitively incorporated into the Master Plan.

The present Arboretum Road follows the route of a dirt track that connected the 'experimental gardens' to the campus. The road continued as College Lane, now Reynold's Walk, to College facilities on the west side of Gordon Street.

Vegetation and Land use
The 1970 Master Plan records the following information concerning land use just prior to the establishment of the Arboretum. The block north of College Avenue was used for field crops, sheep pasture, and orchard. The College beef herd was kept here. A ground hog study was conducted at the east end.

Experimental field plots and field crop areas were located in the central block. There were also two wooded areas, Wild Goose and Victoria Woods, rough meadow and a gravel pit. The gravel pit has since been used for research on rehabilitation techniques. In the Southwoods block, south of Stone Road, woodland and rough meadow were found. Another abandoned gravel pit, since filled, was located near Victoria Road.

An aerial oblique photograph found in the University of Guelph archives, confirms that the land uses in 1935 were similar to those listed above. Aerial photographic coverage is available from 1955, and provides additional information about vegetation features and changes over these years. For example, test plots in 1970 were located east of the creek. In 1935, this area appears to have been used either as pasture or field crops, with test plots located west of the creek closer to the College buildings.

The site layout and vegetation pattern conformed to the City and County road grid, cutting across the drainage and landform patterns of the site. The College test plot areas were laid out on a grid pattern consistent with the City roads and Arboretum Road. Woodlot edges also conformed to these straight lines. There was no intermediate sapling and shrub growth at the edges of the woodlots, as the adjacent fields were plowed or cut cleanly up to these edges.

Hedgerows, some of which still exist on the site, follow the same pattern. The hedgerow extending east from Wild Goose Woods follows the fence line of a property boundary. There are still remnants of this fence in Wild Goose Woods. The hedgerow trees north of College follow the lines of field edges.

Prior to the onset of dutch elm disease in the 1960's there was another small woodlot area near the Apiary north of Arboretum Road. The few mature trees in this vicinity are remnants of this woodlot. All of the mature wooded areas in the central block of the Arboretum occupy land that was too wet for agricultural use. A plantation of white pine at the north end of Victoria Woods was planted by Dr. E.J. Zavitz in 1907. This plantation was largely destroyed by a tornado on May 2, 1983.

Arboretum Road was planted with a straight row of elm trees on each side. The trees extended from the present Apiary buildings west down College Lane, reinforcing the connection between the College buildings and fields. This planting was consistent with the tree planting along College Avenue and Gordon Street, which are illustrated in College landscape plan of 1882.

RECOMMENDATIONS

1. Recognizing the research, educational and interpretive potential of site cultural features, no features should be removed or destroyed. Feasibility of conservation, preservation, or re-use should be fully assessed before any action is undertaken.

2. The positive contribution of cultural features to the visual quality of the site should be recognized in the plan.

3. Historic land uses and patterns, such as orchards, hedgerows and road side tree plantings should be explored as a means of recalling site and regional history in new development. The site in fact represents a complex overlay of natural and cultural systems, both of which can be acknowledged in site planning and design.

4.3 NATURAL ENVIRONMENT

4.3.1 TOPOGRAPHY AND SLOPE

The Arboretum occupies a portion of the southeast extremity of the physiographic region known as the Guelph Drumlin Field. Remnants of two major drumlins are found on the property. The most prominent of these is the large drumlin in the east-central portion of the site. This drumlin is oriented to the southeast and is about 1 kilometre long, extending from a point approximately 200 metres south of College Avenue to a point 400 metres south of Stone Road. The general elevation of the Arboretum lands is 330 metres above sea level, with the top of the large drumlin rising to approximately 342.0 metres. A smaller drumlin occurs near the western end of the property, north of College Avenue, and a minor, but distinctly formed, drumlin feature is bisected by College Avenue approximately 200 metres east of Victoria Road.

With the exception of the stream valley formation at the northern edge of the property and the beginning of the slopes, to the Eramosa River valley, in the same location, the majority of the remainder of the site is relatively flat. The flat areas are comprised of gravel terraces which are the remnants of glacial spillways. Slopes over more than 80% of the site are less than 5%. The remainder of the property is equally divided between the 5-10% and 10% plus slope classes. The slopes greater than 5% are associated with the drumlin formations and the stream valley.

None of the slopes are severe enough to impede access or arboricultural activities, although due to the erodable nature of the soils open cultivation practices should be limited to those areas having slopes under 5%.

The slope classes are illustrated on Map 3.

4.3.2 HYDROLOGY AND SOILS

The following are excerpts from the report prepared for the Arboretum Planning Committee by Jim Dougan Associates, of Guelph, dated January 1986. The complete document with detailed inventory and recommendations may be found as Appendix C of this report. The soil texture and drainage units are recorded on Map 4.

Physiography
The bedrock underlying much of Wellington County and the Arboretum itself consists of a dolostone known as the Guelph Formation. This is one of a series of thick limestones which developed following the accumulation of marine sediments during the Devonian and Silurian ages. Within the Arboretum, this bedrock is covered by 20 to 25 metres of drift material deposited during the last glaciation. However, outcrops of the Guelph Formation and associated limestones are visible along the valley of the Eramosa River.

The Arboretum is located on the southeastern extremity of the physiographic region known as the Guelph Drumlin Field. This particular region contains approximately 300 of the oval-shaped hills known drumlins, consisting of till deposited by the Lake Ontario Ice Lobe of the Wisconsinan Glacier. The Arboretum itself contains remnants of two major drumlins, oriented to the southeast which was the direction of origin of the glacier. The surficial materials consist of a medium-texteured stony till characteristic of drumlins. The low areas between drumlins consist of gravel terraces which formed the spillways from the melting glacier; today they are frequently swampy.

Soils - General Characteristics

The soils in this section of the Guelph Drumlin field are dominated by the Guelph till catena, which is generally comprised of grain sizes as follows: sand - 50%; silt - 35%; clay - 15%. These proportions vary considerably due to post-glacial pulverization of the grey and brown limestones which underly this region, resulting in somewhat calcareous conditions at depth.

The soils are predominantly loams and sandy loams characterized by a dark grayish-brown surface horizon over brown and yellowish-brown sub-surface horizons. Undisturbed surface horizons are stone-free to slightly stony, with moderate stoniness encountered at depths of 40 cm or greater. The Guelph till catena includes Guelph Loam (well-drained), London Loam (imperfectly-drained) and Parkhill Loam (Poorly-drained). Other catenas with minor representation include Brant, Brantford, Burford, Caledon, Fox, Honeywood, St. Jacobs and Woolwich.

Although the surface texture of the Arboretum soils ranges from silty loam to coarse gravelly loam till, most areas are occupied by sandy loam over gravel. The extensive wet areas in and around Wild Goose Woods and the Southwoods contain poorly-drained loams and organic muck.

Surface Drainage

The major surface drainage feature in the Arboretum is the streamcourse which originates in the Southwoods Swamp. This stream, which drops 12 metres between Stone Road and the northern perimeter of the Arboretum, serves a watershed area of approximately 275 hectares. The streamflow is intermittent, with flow in evidence from October to late June.

The stream channel is poorly defined south of Arboretum Road, consisting of ponded areas linked by a shallow channel. Between Arboretum Road and College Avenue, the channel is well-defined, ranging from 1 to 2.5 metres in depth. The banks in this section are stable and well vegetated; the streambed is characterized by a main channel 1-2 metres wide, faced with 0.5 metre depths of sandy loam and silt deposits. These deposits support a dense growth of reed grasses. There are indications throughout this section of past filling and streambank manipulation.

North of College Avenue, the stream is buried in a culvert over a distance of 220 metres. The natural features of the valley are obscured by fill ranging in depth from 1 to 4 metres. A culvert originating from the tile drain system in Zone B intercepts the stream culvert in this

area. At the lower end of the stream culvert, there is a small impoundment. The balance of the channel is similar in most respects to that lying south of College Avenue; a narrow main channel contained within shallow deposits of eroded materials, stabilized by reed grasses. The stream crosses a major till deposit in this section, forming a deeply-incised valley with 15 metre walls.

The permeability of underlying parent materials, and proximity to the Eramosa River valley preclude the establishment of any permanent ponds along this creek, except perhaps south of Arboretum Road. A detailed flow monitoring study should be a prerequisite to a decision to develop such a feature. The 1970 Master Plan concluded that modest flow volumes throughout the year were a constraint to pond development.

A minor surface drainage system which operates on a seasonal basis is located along Victoria Road at College Avenue. Local spring runoff and groundwater seepage from the main drumlin flow into the low lying area running from the centre of Victoria Woods north to College Avenue. Under normal circumstances, this would produce seasonal ponding adjacent to College Avenue. However, additional surcharging takes place from the lands owned by the Ministry of Correctional Services east of Victoria Road, through a culvert located near the south end of Victoria Woods. The result is an extensive area of flooding extending from Victoria Pond to north of the Willow Pond. Gradual drainage takes place through the permeable parent materials; there is no surface outlet at present. Drainage options include a deep culvert along Victoria Road to the Eramosa River, diversion of Correctional Services runoff to another location, or establishment of a channel/culvert combination to connect with the stream located to the west.

4.3.3 VEGETATION

The vegetation inventory is concerned with the uncultivated areas of the Arboretum, including Victoria Woods, Wild Goose Woods and Southwoods. The remainder of the site has been managed for collections, research, and other uses.

Prior Vegetation Information
The vegetation of the unmanaged areas within the Arboretum has been studied in increasing detail.

The 1970 Master Plan contains brief descriptions of six major vegetation types, including Upland Hardwood Bush, Hardwood Bush, Cedar Bush, Swamp, Deciduous Swamp and Rough Meadow. A major study by Janet Krug, 1976, identifies eleven homogeneous vegetation stands. A classification analysis of these stands identified six major vegetation types, including Old Field, Marsh, Willow Scrub, Conifer-dominated Woodland, Deciduous Secondary Growth Woodland and mature deciduous Maple/Beech Woodland.

A floristic survey was done at the same time (Krug and Webb, 1976). A species list was developed that locates plants within six major plant communities, and further specifies location as Victoria Woods, Southwoods, or Wild Goose Woods.

The University of Guelph Arboretum Plant Checklist, 1983, incorporates information from these studies and new observations by Arboretum staff. This listing specifies plant locations as Victoria Woods, Colonel John McCrae Trail, Wild Goose Woods, and Fields.

Further sources of information for Southwoods are a thesis by Gerald Waldron, 1970, on the escaped pear community, and student laboratory reports for Dr. D.W. Smith, Plant Ecology 17-205.

Methods of Vegetation Mapping
Individual vegetation stands were delineated on acetate on 1:10,000 black and white air photographs. Delineations were based on observable species and structural differences. Field observations by Dr. D.W. Smith and Arboretum Naturalist Alan Watson confirmed the stands and stand composition. Grouping of stands into vegetation types was also based on these observations.

Vegetation Types
The following text expands on the Vegetation map index, Map 5.

Marsh. Marsh areas are distinguished by the presence of open water throughout the year. Three small areas, one in Wild Goose Woods and two in Southwoods, occupy the lowest lying land on the site. Grasses, sedges, broad-leaved cattail and several species of willow are the dominant vegetation in the Southwoods marshes. The Wild Goose Woods marsh is slightly drier. Grasses, sedges and nightshade (Solanum dulcamara) are dominant here.

Wooded Swamp. This type extends through the poorly drained areas of Southwoods and Wild Goose Woods. In the latter, Soft Maple is the dominant species. In Southwoods willow and a dense shrub layer of buckthorn dominate the greater part of the area, with soft maple dominant along the western edge. At the northern edge are stands of cedar and aspen, and an open area where sedges are dominant. Where the death of elm trees has created openings, vegetation is very similar to the marsh.

Cedar-Willow Swamp. This type is found in Southwoods, in two areas east and west of the Old Field. cedar, willow, buckthorn and soft maple are present.

Buckthorn-Willow Swamp. Buckthorn and Willow are abundant in this type found in Wild Goose Woods.

Cedar Wood. This type is a dense wood of Thuja occidentalis with sparse ground cover.

Hemlock Wood. Hemlock is dominant in this wood, with cedar present. Some of the hemlock trees may be as much as 135 years old. Maianthlmum canadense, Asarum canadense and Viola sp. dominate the ground cover.

Mixed Coniferous/Deciduous Wood. This type is found in all three unmanaged areas, Victoria Woods, Wild Goose Woods, and Southwoods.

In Southwoods, hemlock, maple, birch, walnut and other deciduous species are present. In Wild Goose Woods, this type is mixed, with a stand of trembling aspen beside the service road.

Victoria Woods is essentially a natural hardwood bush. Sugar maple is the dominant species. Other deciduous species present include white ash, beech, black cherry and basswood. A small stand of soft maple occurs in a wet area adjoining Victoria Road. It is possible that spruce and white pine, on the east and south edges of the wood were planted about 1907 by Dr. E.J. Zavitz, together with a block of white pine north of Victoria Woods that was lost to a hurricane in 1983.

Old Field. This type is found in the abondoned field of Southwoods. brome grass (Bromus spp.) is the dominant grass species. Golden rod (Solidage sp.) and Queen Anne's lace (Daucus carota) are also dominant, with Or-eye daisy (Chrysanthemum leucanthemum), hawkweed, (Hierachium spp.) and other common old field species are also present. Scattered hawthorn trees (Crataegus spp.) are also present.

Advanced Old Field. This type is an abandoned pasture area with escaped pear (Pyrus communis) the dominant tree species. Hawthorn (Crataegus spp.), buckthorn (Rhamnus catharticus), cedar (Thuja occidentalis) and apple are present. Grasses and herbs dominate the ground layer with Festuca oviia the dominant grass.

Young Deciduous Wood. Trembling Aspen and buckthorn are taking over where American elms were lost in the 1960's.

Deciduous Edge. Black poplar, ninebark, willow trembling aspen buckthorn, and other deciduous species are invading open areas at the edge of the wood where maintenance of the ground cover has been discontinued.

Table 2. Vegetation Stands Identified

WILD GOOSE WOODS	
SM	Soft Maple
CT	Cat Tail Marsh
BT & D	Buckthorn & Deciduous
M	Mixed
TA & BT	Trembling Aspen & Buckthorn
M & B	Maple & Beech
BT & W	Buckthorn & Willow
NB	Ninebark
BP	Balsam Poplar
SOUTHWOODS	
H & B & M	Hemlock, Beech & Maple
W	Walnut
D	Deciduous
C	Cedar
TA	Trembling Aspen
BT	Buckthorn
S	Sedge
CT & W & S	Catail, Willow & Sedge
C	Cedar
W & BT	Willow & Buckthorn
SM	Soft Maple
PHOF	Pear-Hawthorn Old Field
BT & W & SM	Buckthorn, Willow and Soft Maple
BW & WP	Black Walnut and White Pine, demonstration of self-pruning.
VICTORIA WOODS	
S	Spruce
WP	White Pine
SM	Soft Maple
M, WA, B, BC, BW	Maple, White Ash, Beech, Black Cherry, Basswood

4.3.4 WILDLIFE

This section presents the following information on wildlife and wildlife habitat resources of the Arboretum.

Wildlife Occurrences
Wildlife Habitat Quality
Wildlife Corridors
Recommendations

Wildlife Occurrences

Wildlife occurrences have been recorded since 1970 by the Arboretum staff and the Guelph Field Naturalists. Bird surveys have been taken annually in spring, summer, and winter, recording species numbers and locations of sightings. These occurrences of wildlife species are listed in Appendix D. Habitat locations for each species is referenced to Map 6.

Table 3. Key to Habitats.

Aquatic	A-1	Marsh, Southwoods
	A-2	Marsh, Wild Goose Woods
	A-3	Pond, Victoria Woods, Wild Goose Woods
Field	F-1	Old Field, Southwoods
	F-2	Nature Centre Field
	F-3	Arboretum Centre Field
Woodland	W-1	Southwoods
	W-2	Wild Goose Woods
	W-3	Victoria Woods

Wildlife Habitat

The important wildlife habitats of the Aboretum are shown in Map 6. The relative quality of these areas is ranked as highest, intermediate, and lowest. Overall, the small size of Arboretum habitat areas is a limitation in their quality. However, the diversity of habitats and movement corridor connections to off-site habitat areas support a wildlife resource that is very significant for Arboretum research and interpretive programs.

Habitat quality depends upon habitat diversity, the size of the habitat, the continuity of wildlife corridors accessing the varied habitats, and interdependence between habitats and microhabitats. These characteristics determine the numbers and variety of wildlife that are supported in a given area. The wildlife habitat areas of the Arboretum are assessed with respect to these characteristics. This assessment, together with wildlife occurrences information, is the basis for ranking relative habitat quality. References to vegetation types in the following discussion can be found on Map 5.

Southwoods

The Southwoods offers a great diversity of micro and macrohabitats. Synergistic effects between field, woodland and marsh areas are significant. Nesting species of birds use the Old Field areas for food. Buckthorn in the Cedar Willow Swamp is also a source of food for birds. The Advanced Old Field provides grazing for deer, proximal to the protection of wooded areas. The Advanced Old Field is also a feeding area for fox. Specialist species found in the Wooded Swamp and Cedar Willow Swamp include Barred Owl, Wood Duck, Red-headed Woodpecker, Winter Wren, Woodcock, Sora Rail, and Snipe. The Cedar Woods provides a good feeding and nesting area for Ruffed Grouse, and also attracts Barred Owls. The capability of the Southwoods to support specialists is

limited by small habitat size. The quality of this habitat is very dependent on wildlife corridor connections with habitat areas off-site to the south. (Map 6)

Wild Goose Woods

Wild Goose Woods is also a relatively high wildlife habitat quality area in the context of Arboretum resources. The Buckthorn Willow Swamp provides some connection with the habitat of Southwoods across Stone Road. The Mixed Wood has only a limited capability to support specialists because of its small size. In the Wooded Swamp and its associated Deciduous Edge Solitary Sandpiper, Black-billed Cuckoo, Northern Water Thrush, Wood Duck, American Bittern, Common Yellowthroat and Scarlet Taninger are found. The habitats of Wild Goose Woods are also highly interdependent with other areas.

Victoria Woods

The habitat quality of Victoria Woods is intermediate because of its small size, isolation from other habitats, and limited diversity. It is, however, a significant resource because of its age and synergistic contribution to diversity to the open areas to the west. Old beech trees in Victoria Woods provide nesting sites for Red-headed Woodpecker. Pillated Woodpecker feeds on insects infesting older over-mature trees.

Other Areas

Generally the habitat quality of all areas of the Arboretum is improving as growth begins to provide cover. The hedgerow that extends east from Wild Goose Woods is particularly important for fall migration because of food resources in plentiful berried trees and shrubs. This hedgerow is also important as part of a well-formed link to Victoria Woods. The pine stand and gravel pit south of Victoria Woods are also important isolated features that could be managed to enhance habitat. These features, together with the hedgerow, begin to form a movement corridor link between Wild Goose and Victoria Woods.

Wildlife Corridors

Wildlife movement corridors are shown in Map 6. The limited size of the Arboretum habitat areas means that these corridor links with off-site habitat areas are critical to maintaining habitat quality, and numbers and variety of wildlife species. The Eramosa River to the north and wooded areas to the south of the site should as much as possible be managed as part of the wildlife habitat system.

Recommendations

1. The existing high and intermediate quality habitat areas should be conserved. Uses and facilities that would reduce habitat quality should be excluded from these areas. Uses and facilities adjacent to habitat areas should be sited and managed to complement habitat quality as much as possible.

2. Wildlife corridors should be maintained and enhanced between on-site habitat areas. Corridor connections to the Eramosa River and natural areas to the south should be developed.

3. Restore natural vegetation at the edges of creeks and water bodies.

4. Trails or paths should not be built continuously parallel with creek and pond edges.

5. These areas should remain essentially unmanaged. Dead trees should be cut down only where hazardous to trail users.

4.3.5 CLIMATE

Climatic conditions for the Guelph area are summarized in the following Tables and Figures.

TABLE 4

Climatic Summary for Guelph
(43°31'N 80°14'W 334m)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Daily Maximum Temperature	-3.4	-2.3	2.1	10.9	17.5	23.2	25.7	24.7	20.7	14.4	6.0	-0.7	11.6
Daily Minimum Temperature	-11.0	-10.6	-5.9	0.7	5.9	11.6	13.6	12.8	9.3	4.0	-1.0	-7.6	1.8
Daily Temperature	-7.2	-6.5	-1.9	5.8	11.7	17.4	19.7	18.8	15.0	9.2	2.5	-4.1	6.7
Standard Deviation, Daily Temp.	2.1	2.2	2.2	1.8	1.8	1.2	1.4	1.5	1.5	1.8	1.4	2.2	0.6
Extreme Maximum Temperature	16.7	13.9	24.4	28.9	32.2	35.0	38.3	38.3	36.7	29.4	23.9	18.3	38.3
Years of Record	86	85	85	87	88	88	87	88	87	85	87	86	
Extreme Minimum Temperature	-37.2	-32.8	-28.9	-16.1	-7.8	-1.1	1.7	-1.1	-6.7	-12.8	-20.6	-31.1	-37.2
Years of Record	85	85	85	87	88	88	86	88	87	86	87	85	
Rainfall	21.3	21.6	37.3	67.5	72.4	70.6	82.4	81.5	63.4	70.9	62.2	39.2	690.:
Snowfall	36.3	29.3	25.1	6.2	0.2	0.0	0.0	0.0	0.0	2.5	13.0	31.4	144.0
Total Precipitation	56.3	50.5	62.5	73.9	72.7	70.6	82.4	81.5	63.4	73.4	74.9	71.2	833.3
Standard Deviation, Total Prec.	22.7	20.8	30.6	24.2	42.2	35.3	35.4	46.0	31.4	49.0	27.8	23.8	115.9
Greatest Rainfall in 24 hours	54.4	63.5	38.1	45.2	66.0	74.7	83.6	103.4	52.8	95.8	46.2	63.5	103.4
Years of Record	87	87	86	85	87	88	88	87	86	86	87	87	
Greatest Snowfall in 24 hours	43.2	30.5	25.4	30.5	7.6	0.0	0.0	0.0	T	25.4	55.1	33.0	55.1
Years of Record	85	86	86	85	88	88	88	88	87	87	87	87	
Greatest Precipitation in 24 hours	54.4	63.5	43.2	45.2	66.0	74.7	83.6	103.4	52.8	95.8	55.1	63.5	103.4
Years of Record	85	86	86	84	87	88	88	87	86	86	86	87	
Days with Rain	4	3	6	11	11	9	9	10	10	10	9	6	98
Days with Snow	12	10	7	2	*	0	0	0	0	*	5	11	47
Days with Precipitation	15	12	12	12	11	10	9	10	10	10	13	16	140

* less than 0.005 MJm^{-2}.

TABLE 5
Frost Occurrence

	Last in Spring	First in Fall
Average DATE:	May 15	September 28
10% Risk DATE:	May 30	September 14
Extreme DATE:	June 6	August 30

Average Frost Free Season: 136 Days

A weather station was established at the Arboretum in 1975. Local data is available for temperature, precipitation, rate of rainfall, snowfall (niper) and sunshine. Research is underway to determine microclimatic conditions on site.

DOMINANT WIND DIRECTIONS.

WEST – fall, winter, & spring.

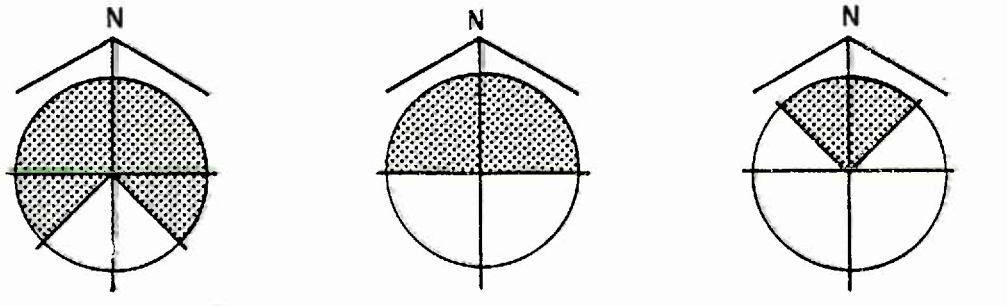
NORTH WEST – strongest gusts

NORTH EAST – prior to snow storms

SOUTH – summer

figure 1

SOLAR EXPOSURE



WINTER SOLSTICE EQUINOX SUMMER SOLSTICE

figure 2

4.4.1 SOILS LIMITATIONS

The hydrology and soils inventory (Section 4.3.2; Map 4) indicates a wide diversity of soil conditions on the Arboretum site. The advantage of the diversity is that appropriate conditions may be found for the equally diverse requirements of the various woody plant species in the collections. Each different soil condition may be regarded as an opportunity rather than a constraint for woody plant culture and collection development.

However, extreme conditions do tend to limit the number of species suited to a particular site, and in addition influence site management practices. Therefore, significantly large areas of poor soil drainage, seasonal flooding, seasonal drought, erodable slopes, or thin topsoil are outlined on Map 7. These extreme soil conditions have implications for land use and collection siting.

4.4.2 SIGNIFICANT NATURAL AREAS

The significant natural areas of the Arboretum are: Victoria Woods and Pond, Wild Goose Woods and Pond, Southwood, and the stream corridor which originates near Stone Road and traverses the property to the Eramosa River north of College Avenue. These areas are described in terms of their flora and fauna in Sections 4.3.3 and 4.3.4.

The natural areas provide opportunities for natural history studies, conservation, and ecological research. The institution of land uses and management practices which will tend to link the natural areas to each other will enhance these opportunities.

Specifically, there is an opportunity to link the Eramosa River Valley with the natural area and wetlands to the south of Stone Road through the creation of a wild life corridor. This objective may be achieved by allowing an area along Victoria Road and a band between Victoria Woods and Wild Goose Woods to assume a more natural character.

The stream corridor which is presently overgrown and narrow and straight in sections is currently under-exploited as a natural feature. Appropriate design of adjacent plantings, and sensitive reconfiguration of the stream banks where it traverses the open areas and leaves the Arboretum property is essential in order to derive full value from this resource. Concern for the character of the stream treatment is important in order to best express its potential natural beauty.

4.4.3 VISUAL ASSESSMENT

The purpose of this visual assessment is to analyze the visual character of the Arboretum site and make recommendations as to how site planning and design can respond appropriately to positive and negative aspects of site character. This assessment will assist in meeting the objective of maintaining a high standard of aesthetic quality in the development of plant collections and support facilities.

Native woodlands and fields dominate the site. A large drumlin extends from the central block south across Stone Road. A second drumlin that affords good views over the site and the City of Guelph occurs in the north-west corner of the site. In addition to these natural features, there are several buildings on the site, a network of roads, parking facilities, and collection and support areas with a variety of cultural and landscape approaches. The site is therefore visually very mixed, and some juxtapositions of land use are thematically ambiguous. The openness of much of the site certainly contributes to this. Areas that have been developed were open fields in 1970, with limited opportunity for vegetative or topographic screening or visual separation of incompatible uses.

A rural quality predominates and sets the site apart from the more intensively developed west campus. The site is typical of much of the landscape surrounding the City of Guelph. However, it is likely that in the future the subtle landforms and luxuriant vegetation will become more unique as urban land uses spread in the surrounding area.

METHOD

Homogeneous landscape units were identified to make comparisons of scenic quality between areas of the site. Areas were considered to be homogeneous in landscape character if vegetation and topographic features made the area visually distinct from the rest of the site. This was a means of assessing visual quality in a broad sense. Detailed distinctions between collection areas were not made for the purposes of this broad scale evaluation. Given the relatively immature condition of the collections areas the method adopted yields a good description of the overall character of the site and its strongest visual features. Aerial photographs, vegetation and topographic mapping and site observations were used in the assessment.

Special landscape features were considered in addition to the qualities of homogeneous units. Special features are landform, vegetation, or cultural features that are unique in the context of the site and have an impact on visual quality.

The basis of the delineation of landscape character units is outlined below. The following section describes these character units shown on Map 8.

Table 6. Landscape Character Units

TOPOGRAPHY

TF -- Flat to gently sloping, slopes less than 5%

TS -- Moderate to steeply sloping, slopes greater than 5%

VEGETATION

V1 -- Agricultural field crops

V2 -- Nursery and Plantation

V3 -- Old Field or Meadow condition. Planted material, if any, is sparse and very small.

V4 -- Advanced Old Field

V5 -- Young Collections Plantings, immature and lacking tree canopy, variety in detailed layout and design.

V6 -- Established Collections Plantings, early stage of maturity; some tree canopy present; variety of design and detail layouts.

V7 -- Woodland

DESCRIPTION OF LANDSCAPE CHARACTER UNITS

Flat Cultivated Field TF-V1
The expanse of flat cultivated field has a manicured appearance and little visual variety. The area is visually dominant from Arboretum Road.

Flat Nursery and Plantation TF-V2
The planting pattern and open character of these areas offers little visual variety. The regularity of the grid planting pattern is very evident where material is small, but may become less dominant visually when material is larger and canopy developed.

Flat Old Field or Meadow Condition TF-V3
Old field offers more variety, interest and colour than the cultivated field.
The old field area west of the Arboretum Centre is surrounded by a split rail fence. Views are very open. The subtle qualities of the old field vegetation suffer because of the contrast with manicured lawn areas that are visible adjoining it.

The old field area in Southwoods has a more appropriate scale and context, surrounded by woodland, with minimal visual intrusions from roads and structures.

Flat Young Collections Plantings TF-V5
These areas are still mainly open in character as collection materials are small in size. There is no screening or canopy to give visual unity and spatial enclosure. The lack of scale is particularly evident to the west of the Arboretum Centre. In some area, edges of existing forest, mature trees, or landform features give some spatial enclosure and begin to develop a pleasant sense of scale, as in the Dwarf Conifer Collection.

Flat Mature Woodland TF-V7
Most of the mature forest on the site occurs on flat land. These areas are for the most part poorly drained and were not cleared for agricultural use.

Deciduous vegetation predominates in the woods of the central block. There are stands of cedar and hemlock in Southwoods.

Sight lines in the deciduous wooded areas are very reduced during the growing season due to the dense shrub layer. Sight lines are longer in the Wooded Swamp areas where there is less shrub layer. During the winter, there is little screening in these areas and the roads are visible from these woods. The grove of trees north of Arboretum Road near the Aviary facility is a remnant of a woodlot area. This small area has open views and a pleasant scale provided by the mature tree canopy.

The mature tree canopy and rich variety of ground covers give the woodlands a special quality.

Sloping Old Field TS-V3
This condition occurs on the slopes of both drumlins. The old field vegetation is rich in colour and texture. The drumlin slopes either contain views, giving a pleasant sense of scale, or offer changing vistas over the site. Looking west from the Nature Centre, for example, the drumlin crest and slope provide enclosure. Though lacking in shrub and tree vegetation, these areas are visually more interesting than flat old field areas.

Sloping Advanced Old Field TS-V4
This combination of vegetation and topography occurs at the east end of Southwoods. Sight lines here are moderate to short. Woodland edges provide a strong sense of enclosure on the south and west. The ground cover consists of a variety of old field species. Mature pear and hawthorn trees give a pleasant sense of scale. The drumlin slopes give some topographic variety. The thick growth of ground cover makes the area nearly impassable off the narrow foot paths.

Sloping Young Collection TS-V5
This condition occurs in the Conifer Collection at the north-west corner of Stone and Victoria Roads. The topographic variety of this area is

still more powerful visually than the collection plantings, although these are beginning to lend a sense of scale. Victoria Road is very visible from the slopes of the drumlin and high speed traffic on this road is noisy. The pine plantation and rehabilitated gravel pit are interesting features.

Sloping Established Collection TS-V6
This description applies to the Willow Collection in the north-east corner of the site. Victoria Road is very dominant and has a negative visual and auditory impact. The collection material, all deciduous, is beginning to reach a size where it lends scale and some screening during the growing season.

SPECIAL FEATURES

Special features have a localized effect on scenic quality, and include special landforms, historic features, or unique vegetation features. The following descriptions expand on the legend of Map 8.

View from Arboretum Centre Drumlin
The crest of this drumlin has good views to the City of Guelph and the Arboretum site. The southern end of the ridge has less desirable views over Victoria Road and beyond. The view east is enclosed by the edge of Wild Goose Woods, in contrast to the expansive to the north and west. The hedgerow contains views to the south and creates an enclosure to the view over the manicured Rosaceae collection. The East Residence and the Stadium intrude negatively on the view to the west. Tree growth gives good screening of the road and Arboretum Centre to the north, but is beginning to obscure views over the City.

North-west Drumlin
The slopes of this drumlin are quite dramatic as approached on the existing road. The top of the drumlin is a plateau, and views vary from different locations near the crest. Generally, views are very pleasant. College Avenue is not visible from the crest. The service buildings are somewhat dominant looking east.

Rehabilitated Gravel Pit
The steep enclosing sides of the gravel pit effectively display a variety of herbaceous and shrubby material in a rugged unique setting, and demonstrate an important area of research. The small scale of the enclosure adds interesting variety to the interpretive trail.

CREEK GULLY

This gully is located on the north site boundary. The strong enclosure from the land form feature creates a pleasantly scaled space to explore on foot.

Stone Houses
Grant House and the Harrison Farm House are interesting features that add to the rural character and recall the history of the site.

Carriage House
The Carriage House is an interesting historic and visual feature on Arboretum Road.

Historic Vegetation Features
There is very little mature vegetation outside the wooded areas of the site. The few features are visually prominent and have a positive effect on scenic quality. The strong straight edge of the Hedgerows, with their mixture of species are very characteristic of the landscape around Guelph. The Pine Plantations near the Nature Centre are prominent localized landmarks.

Water Features
Victoria Pond is a high quality water feature that adds significantly to the quality of the area. Wild Goose Pond has some potential, but grading around the edges blocks views and reduces its value. The creek is quite insignificant, but has potential for improvement.

NON-ARBORETUM LAND USES

Where views into these areas are not controlled, the impact on the visual quality of the Arboretum is negative. This is particularly true of the facilities at the west end of Arboretum Road. These facilities are highly visible from the road, particularly during the winter. Views into the Physical Resources storage areas from Stone Road are also unattractive and out of character the surrounding landscape.

SCENIC QUALITY

Map 8 also summarizes the overall visual quality of the site. The landscape character units described above are ranked with respect to visual quality. Woodland areas and advanced old field rank the highest. This ranking is given because the mature vegetation offers a variety of textures and spatial effects, and a dramatic sense of scale under the high canopy. Intermediate quality areas are old field areas on flat land, and a range of vegetation types, including old field, young collections and maturing collections. On sloped areas of the site. Areas of lowest visual quality are flat areas with a range of vegetation types, including cultivated field, nursery and plantation, and young collections.

RECOMMENDATIONS

1. Incorporate areas of high visual quality and features into the circulation and framework concepts, linking them effectively. For example, drumlin crests could be used as lookouts.

2. Improve visual access to water features, particularly Victoria Pond, and enchance water features. Enchance the quality of the creek with plantings that express wetland condition.

3. Framework and open space planting should preserve and enhance the view from the Arboretum Centre to Church of our Lady, and preserve selected views from drumlin crests. Do not reinforce views to the East Residence and the stadium.

4. Existing woodlands and mature trees have a high visual quality and should be retained.

5. Screen incompatible features and landuses with plantings as part of the framework system. Use coniferous material judiciously for better screening in winter.

6. Framework plantings should be linked to the existing woodlands and the regional landscape through the use of appropriate species and planting patterns. Framework may also reflect the character of adjacent collections where this is appropriate.

7. Group areas with similar maintenance requirements together to assist in developing visual and thematic unity,

4.4.4 COMPOSITE SUITABILITY

This section presents the analysis of site resources included in the mapping of composite suitability for the site. Suitability for Collections, Test Plot Research, Environmental Research and Interpretation are indicated on Map 9.

The analysis for each of these uses includes a description of use, the site characteristics needed for the use on site resource values. The resulting map shows areas that, based on resources and impacts, are suitable for these uses. Some areas are suitable for more than one use, and, in this case, all potential uses are given. The analysis in Section 4.4.5 applies program needs such as access and space requirements to resolve conflict areas and develop the zoning plan.

Suitability for Development
Present and predicted needs did not necessitate an exhaustive analysis for development suitability. Major facilities are all in place, and expansion would most likely occur around existing structures and circulation facilities. There are no engineering or biophysical constraints in these locations. New development possiblities are adjustments in vehicle and pedestrian access and circulation, parking, and building of small information and orientation structures.

New structures and circulation facilities should not be built within habitat conservation areas. Should such additions be considered a careful assessment of the effects of increasing levels used must be made.

Suitability for Collections
The Arboretum collections include major botanic family collections, the Synoptic area, and plant use demonstration and display areas. Differences in site requirements of collections are considered in the

Collections Plan, Map 11. For the purposes of this suitability analysis, collections are considered in the aggregate sense.

No areas of the site can be considered optimal for all possible collections. The suitability of the site as a whole for an Arboretum is in fact a result of the range of growing conditions available. The areas suitable for collections, then, includes all soil types. All slope classes are also included, as the closed ground cover condition typical of collections minimizes erosion potential.

All significant natural areas are excluded as this use would degrade the value of these resources.

Suitability for Interpretation
Areas of the site are located that have a high suitability for nature interpretation and education programs open to both University of Guelph students and the general public. Suitability is based on the presence of appropriate hydrologic, geologic, vegetative, wildlife and cultural resources. In determining suitability, areas are excluded from this use where the use would have excessive impacts damaging to the resource.

Resource factors were assessed as follows:

1. Significant Natural Areas
All significant natural areas, have high suitability for interpretation.

2. Cultural Features
A concentration of cultural features in an area increases the suitability for intrepretation. The best concentration of such features occurs south of the J.C. Taylor Nature Centre including the gravel pit, hedgerow, and pine plantations. Grant and Harrison houses on College Avenue also have interpretive potential.

3. Representative Biophysical Types
A site suitable for interpretation should ideally exhibit a range of representative biophysical types. Therefore, an area of drumlin upland has been included between Wild Goose Woods and Victoria Woods.

Suitability for Ecological Research
Ecological research requires areas with a variety of vegetation, soils and habitat types.

All significant natural areas, are suitable for ecological research. Provided this research is of a non-manipulative nature, and has no negative impacts on the resource.

Suitability for Test Plot Research
Test Plot Research is carrried out by the Arboretum and outside departments. Planting is usually done on a rotation of up to five years, and open soil cultivation is practiced. A grid planting pattern is frequently required for test plot areas.

Test plot research requires sites with slopes of less than 5% to minimize erosion hazards. A range of soil types, dry to moist, and a range of exposure conditions are desirable for situational evaluation.

Impacts of test plot research on natural areas would damage resource values. Therefore, significant natural areas are excluded from this use.

4.4.5 ACCESS, ORIENTATION AND FACILITIES

Although it is a young institution which is still very much in its developmental stages, the University of Guelph Arboretum has many positive attributes. The intent of this section however, is to summarize the Arboretum's physical shortcomings, to better define the problems which the Master Plan seeks to correct.

i) **Distance:** The Arboretum is generally perceived to be far from campus. The major contributing factors are the lack of a defined entrance and the distance of the main teaching collection (Synoptic collection) from campus. As there is no visitor reception area until one arrives at the Arboretum Centre (closed on Saturday and Sunday) the uneasy feeling some visitors experience is understandable.

In addition, as the main pedestrian walk, running east and west across campus, ends at East Ring Road, and as the Arboretum is up the gravel road and out of view over the next hill, the impression that it is not part of the campus is enhanced.

ii) **Visitor Orientation:** This problem is closely linked with i) above. As the Arboretum Centre was not designed as a visitor orientation or reception area there is a requirement for additional facilities which will serve this need.

Devices such as information kiosks, directional signage, and strong landscape indicators and landmarks are noticibly lacking.

iii) **Public Use Facilities:** There is not at present a suitable public meeting place or work area for groups such as the horticultural societies. The Arboretum Centre is an administrative and university conference facility and as such does not lend itself to use by public groups or individuals. The only public washrooms at the Arboretum are in the Arboretum Centre and these are not open on weekends.

iv) **Expression of Natural Systems:** The collections and other plantings should express the Arboretum's natural character more strongly than is the case at present. This is particularly applicaple to the stream corridor.

v) **Sequential Experience:** The potential for directing Arboretum visitors through a sequence of significant experiences and revelations has not been fully exploited.

In some cases land use or collection juxtapositions seem to be out of context or have harsh transitions which serve to diminish the quality of the visitor's experience.

In many cases this problem is due to the lack of a well developed framework planting. The lack of framework also has negative horticultural implications due to the open and windswept nature of much of the site.

vi) **College Avenue:** As College Avenue divides the two publicly accessible areas of the Arboretum few visitors are aware of the tree collections in the northern block. Opportunities to cross the street must be improved both for the sake of safety and to bring the area north of College Avenue more into use.

In general, the Arboretum will benefit from physical reorganization, upgrading of existing facilities and the inclusion of additional facilities, to make the institution more useful and welcoming to its users.

5.0 DESIGN PRINCIPLES

The following design principles were developed in response to the user survey and the biophysical resource inventory and analysis. The planning and design of the Arboretum shall be consistent with these principles.

5.1 BIOPHYSICAL RESOURCES

The biophysical resources of the site, including slope, soils, water, existing vegetation, cultural features, wildlife, outstanding views and areas of high visual quality shall have a major influence in site planning. Land use will be based on suitability for planning needs in the following ways:

Allocation of site resources will be based on a suitability analysis that considers biophysical resources, planning needs, and the impacts of uses on resource values.

Natural systems of the site will be recognized and enhanced.

Existing Arboretum natural areas will remain unmanaged.

The limited carrying capacity of Arboretum natural areas is recognized and planning and design of the site will control, direct, and monitor use levels appropriately.

The development of the Arboretum site shall reflect the character of the regional landscape. This principle recognizes the important regional orientation of major programs and collections. The biophysical resources, natural systems and historic uses and patterns are the basis for developing a special character for the Arboretum.

The educational, interpretive and research value of cultural features and evidence of historic landuse is recognized, and guidelines for their restoration, conservation or protection are established.

5.2 ZONING

There shall be a zoning system for the site that locates major functional use areas. These are as follows:

Collections includes botanic family collections, the synoptic area, and plant use demonstration areas.

Support includes buildings, roads and walks, the nursery, and test plots.

Framework includes plantings expressly for the purpose of imparting visual order, spatial definition, and/or wind shelter to the Arboretum site.

Reserve includes land held for anticipated demand for research plots, gene bank, seed orchard, and/or Arboretum collection expansion.

Uncultivated includes woodlot, regeneration and old field conditions permitted to evolve under low intensity management practices, as interpretive, educational and research.

Site zoning is based on planning needs, the existing built environment, and the inherent qualities of the site.

The zoning plan assigns site resources to their most appropriate use and facilitate their development, management and use in a manner that protects resource values over the long term.

The zoning plan will recognize the need for key educational functions closer to the campus.

Opportunities for multiple use and complementary uses between zones will be encouraged.

5.3 NODES

Activity and orientation centres or nodes will be developed to better serve the needs of users and provide amenities for pedestrians. Users will have alternatives to driving to the centralized parking and orientation at the Arboretum Centre.

Nodes will be located based on site resources and user access requirements.

Nodes will be differentiated by function, primary user groups served, and resources. Each node will have a distinct character and serve as an introduction to different aspects of the Arboretum resources and programs.

5.4 MOVEMENT SYSTEMS

5.4.1 ORIENTATION AND ENTRY

Orientation areas give user groups access to key areas of interest. An orientation area linked as closely as possible with the campus will serve to increase the value of the Arboretum as an educational resource and outdoor classroom.

An exciting and clear sense of entry to the Arboretum will be developed, establishing an image for the Arboretum distinct from the East Campus, and creating an appropriate transition to the more natural and pastoral Arboretum environment.

5.4.2 CIRCULATION

The development of the circulation system will be based on user needs and site resources, link the node points together, and provide appropriate access to site features and resources. The circulation system will develop the best possible links with the campus, to facilitate use of the Arboretum for educational purposes.

The system will encourage pedestrian access to and movement within the Arboretum. By minimizing dependence on vehicles undesirable visual and auditory impacts of vehicles will be reduced.

The circulation system will be developed as a hierarchy, clearly differentiating primary and secondary pedestrian and vehicular routes.

Pedestrian Circulation
The pedestrian circulation system will provide visitors with a choice of routes, for long or short visits, and will develop and maintain imagery and a sequence of experience and environments that is appropriate for different users.

The pedestrian system will be designed as a loop system giving users the option of an alternate return route.

Vehicle Circulation
Convenient access for all users, including handicapped users, will be retained while reducing the physical, visual and auditory impacts of cars on the site.

Service and public roads will be clearly differentiated and designed to standards that reduce undesirable impacts on the site.

5.5 OPEN SPACE SYSTEM

A hierarchy, sequence and scale of open spaces will be developed to respond to cultural requirements, user needs, functional requirements and aesthetic considerations.

Identified significant view corridors to the Church of Our Lady and the City of Guelph, and visual links between identified landmarks on the site will be perserved and enhanced.

5.6 FRAMEWORK

Framework planting is a consistent site planting system that contributes to climate control, visual organization, and character of the site. Framework will be developed consistent with the following principles:

Framework planting will be used to create protected areas through wind control and provide other desirable climatic effects.

The system will be used to develop site character and reflect the regional landscape.

Development will complement and enhance the spatial qualities of existing vegetation masses and topographic features.

The system will complement the purposes, uses, and aesthetic qualities of the zones which it connects.

5.7 COLLECTIONS

Access to collections for educational purposes will be improved by locating these collections close to campus.

Collections will be sited where soil conditions, micro-climate and slope and exposure are optimal for their establishment, growth, and achieving a characteristic form.

5.8 MAINTENANCE

Between zones, and within zones, there is a range of possible maintenance levels related to functions and intensity of use. These are:

High maintenance functions will be grouped together in the plan to allow for ease of maintenance and facilitate visual integration of these areas.

Areas requiring mowing will be designed to minimize the use of hand mowers.

6.0 LONG RANGE PHYSICAL PLAN

6.1 LAND USE ZONING

A land use classification system has been developed to zone the Arboretum property for planning purposes. These zone designations reflect the major extant and foreseeable land use types. The zoning concept responds to existing land use patterns where appropriate. They are Collections, Support facilities, Framework, Research Reserve, and Uncultivated lands (see Fig. 3 following).

The delineation of the zones has been undertaken in a manner which achieves a balanced response to the analyses of User needs (3.0), and Biophysical resources (4.0), with respect to the project Design Principles (5.0). The resulting land use concept is illustrated on Map 10. As in many cases, more than one functional requirement may be met by a particular planting (e.g. Uncultivated areas will serve as Framework in the case of the edge of wooded areas) the land use zoning map, which illustrates the predominant land uses, should not be interpreted to preclude other superimposed or secondary land uses for any given area.

6.1.1 COLLECTIONS

The Collections designation applies to those areas of tne Arboretum which are to be devoted to the display of catalogued plant materials, either in taxanomic groupings or as demonstrations of horticultural, economic and/or environmental applications or associations.

Individual collections have biases toward one or more major purposes such as academic interest, general interest, research and environmental interpretation. The disposition of individual collections over the site responds to both their designated major purposes and the cultural requirements of the majority of the individuals within the collection. Collections of identical or similar purpose or character have been grouped together in response to the need to provide a coherent and logically complete experience for visitors.

It has been recognized that some collections may be of a conceptual nature only, and will not occupy discrete parcels of land.

A list of collections follows. New collections are marked with an asterisk. The reader is asked to refer to Appendix E where a complete description of each collection is furnished.

Table 7.

THE COLLECTIONS	NO.
Synoptic Collection	(1)
Comprehensive Botanic Collections	
Aceraceae	(2)
Betulaceae	(3)
Ericaceae	(4)
Fagaceae	(5)
* Juglandaceae	(6)
* Leguminosae	(7)
* Oleaceae	(8)
Rosaceae	(9)
Rosa	(10)
Salicaceae	(11)
Tiliaceae	(12)
* Ulmaceae	(13)
Coniferous trees	(14)
Dwarf conifers	(15)
* Shrubs and minor tree families	(16)
Lilacs	(17)
Demonstration Gardens & Displays	
Formal hedges	(18)
Vines and Climbers	(19)
** Street trees	(20)
Edible nut trees	(21)
** Fall colour	(22)
* Habitat demonstration	(23)
Land reclamation demonstration	(24)
* Toxic plants	(25)
Carolinian plant associations	(26)
** Native trees and shrubs	(27)
** Windbreaks	(28)
** Informal hedges	(29)

* New collection

** Collection which is part of the framework planting and may or may not occupy a discrete location.

6.1.2 RESEARCH RESERVE

The Research Reserve designation applies to those zones which are to be held open for use as research plots where cultivation of the soil and lining out of plant materials for experimental or observational purposes is required. The gene bank and seed orchard functions are to be accommodated within this zone.

6.1.3 UNCULTIVATED

Areas with the Uncultivated designation are those subject to little or no maintenance. These wild or natural areas are to be retained or developed for their value as interpretive, ecological, and contextual resources for environmental studies at all levels, and as wildlife corridors and habitats.

The uncultivated zone may be in a wooded or meadow condition, and in many cases may serve a secondary purpose as Framework.

6.1.4 SUPPORT

The Support designation applies to facilities which form the operational infrastructure of the Arboretum. These facilities are:

- nursery
- test plots
- roads and paths
- parking lots
- visitor orientation nodes
- assembly spaces
- built facilities
- utility corridors

6.1.5 FRAMEWORK

The Framework designation applies to two closely related functions. One of the purposes of the Framework is to contribute to the spatial structure and organization of the Arboretum, through the creation of suitable settings for the collections and other facilities, and through the provision of appropriate visual experiences for Arboretum users. Spatial articulation and visual control will be achieved through the use of screen, canopy, and feature plantings.

The other function of the Framework zone is to designate the locations of major shelter plantings which will contribute to the successful establishment, and ongoing protection of less hardy species. Traditional windbreak patterns and configurations will not always be appropriate. Although, where appropriate, the function of the former Windbreaks and Informal Hedges collections may be demonstrated.

ARBORETUM LANDUSE CLASSIFICATION SYSTEM

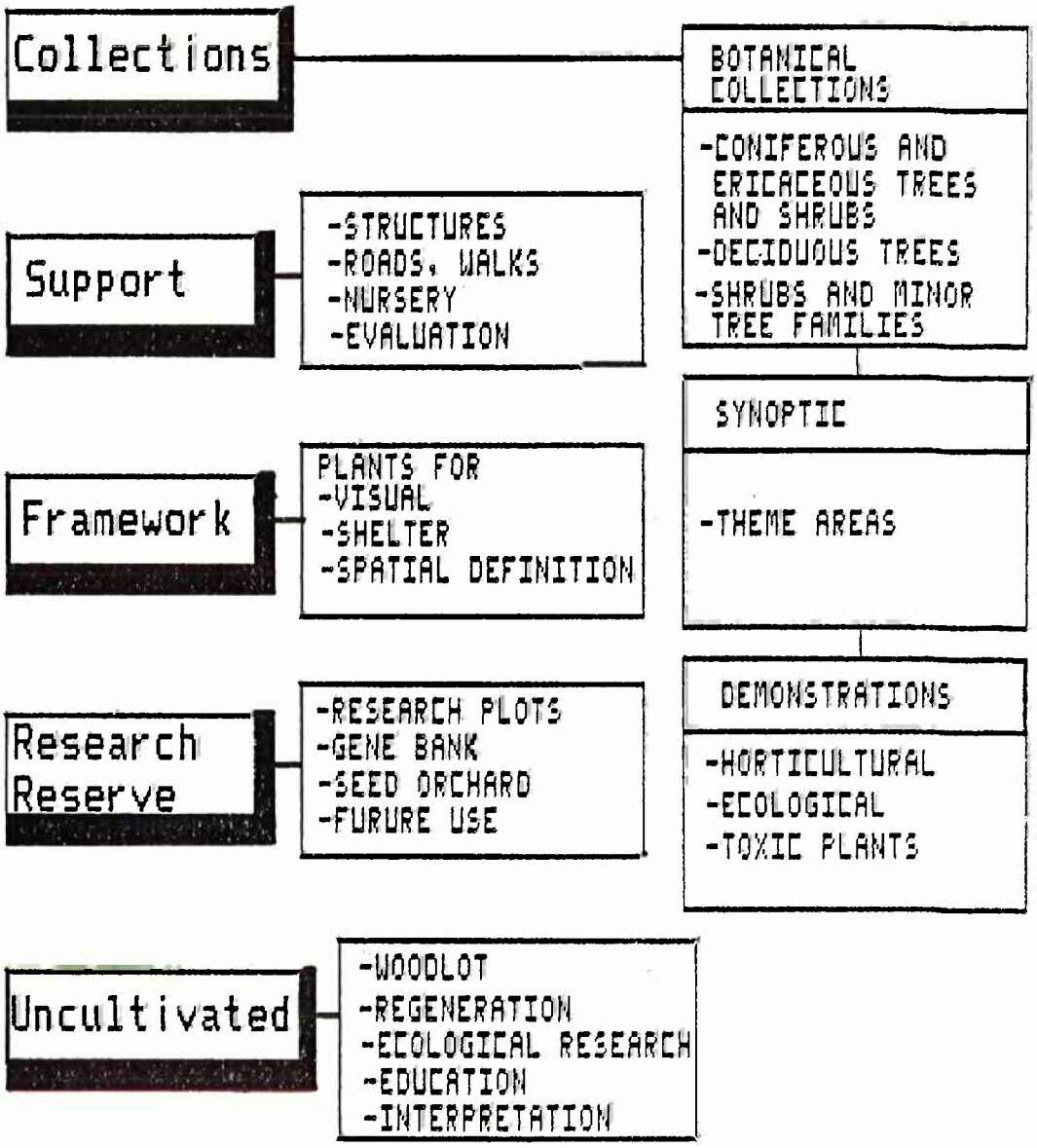


figure 3

6.2 LAND NEEDS AND BOUNDARIES

The boundaries of the Arboretum will remain as they presently exist (see Map 2) with three exceptions which will increase the Arboretum size from its present 145 hectares to 165 hectares.

a) The Grant house, and surrounding grounds (located on the south side of College Avenue 200 metres west of the Arboretum Service Centre entrance) must be annexed for development as a user facility in the long term (16 hectares and building).

b) The level area, (presently used as a corn field) which is located along the western edge of the property between Arboretum Road and College Avenue will be annexed for collections and entry feature development (8.8 hectares).

c) The land area extending south along Victoria Road from the present southern boundary to the University of Guelph property line should be included under the management influence of the Arboretum. Annexation of this area will ensure the continued integrity of the wetland system and associated plant and animal communities south of Stone Road (11.04 hectares).

6.3 PLANNING CONCEPT

Using the "Design Principles" as a philosophical basis and the "Zoning Plan" to guide land use allocations, the Planning Concept for the Long Range Plan is illustrated in the following figure.

The framework of the functional plan will be comprised of the circulation system and the nodel development/activity areas. The proposed activity and orientation nodes will be developed to better serve the needs of users and provide amenities for pedestrians. Users will have alternatives to driving to the centralized parking and orientation at the Arboretum Centre. Nodes will be differentiated by function, primary user groups served, and resources. Each node will have a distinct character and serve as an introduction to different aspects of the Arboretum resources and programs. Four nodes are proposed as follows:

1. Central Node (Arboretum Centre and Nature Centre):

   - Major arrival area (parking 50 cars)
   - Orientation and staging functions for Arboretum Centre, major collections and Nature Centre

- Landscape character to be naturalistic in keeping with architecture and setting
- Arboretum Centre to remain administrative and meeting facility
- Nature Centre continue to be focus for nature programmes

2. Site Entrance Node:

- Major pedestrian arrival area
- Site entrance
- Orientation and staging for Synoptic Collection and Wild Goose Woods nature trails

3. Grant House:

- Long range public user node
- Arrival and parking area
- Centre for horticultural activities and 'Friends' organization
- Amenities such as gift shop, tea room and meeting rooms
- Demonstration and display gardens
- Landscape character to be historic and cultural

4. Service Centre (non-public):

- Centre for maintenance and research operations

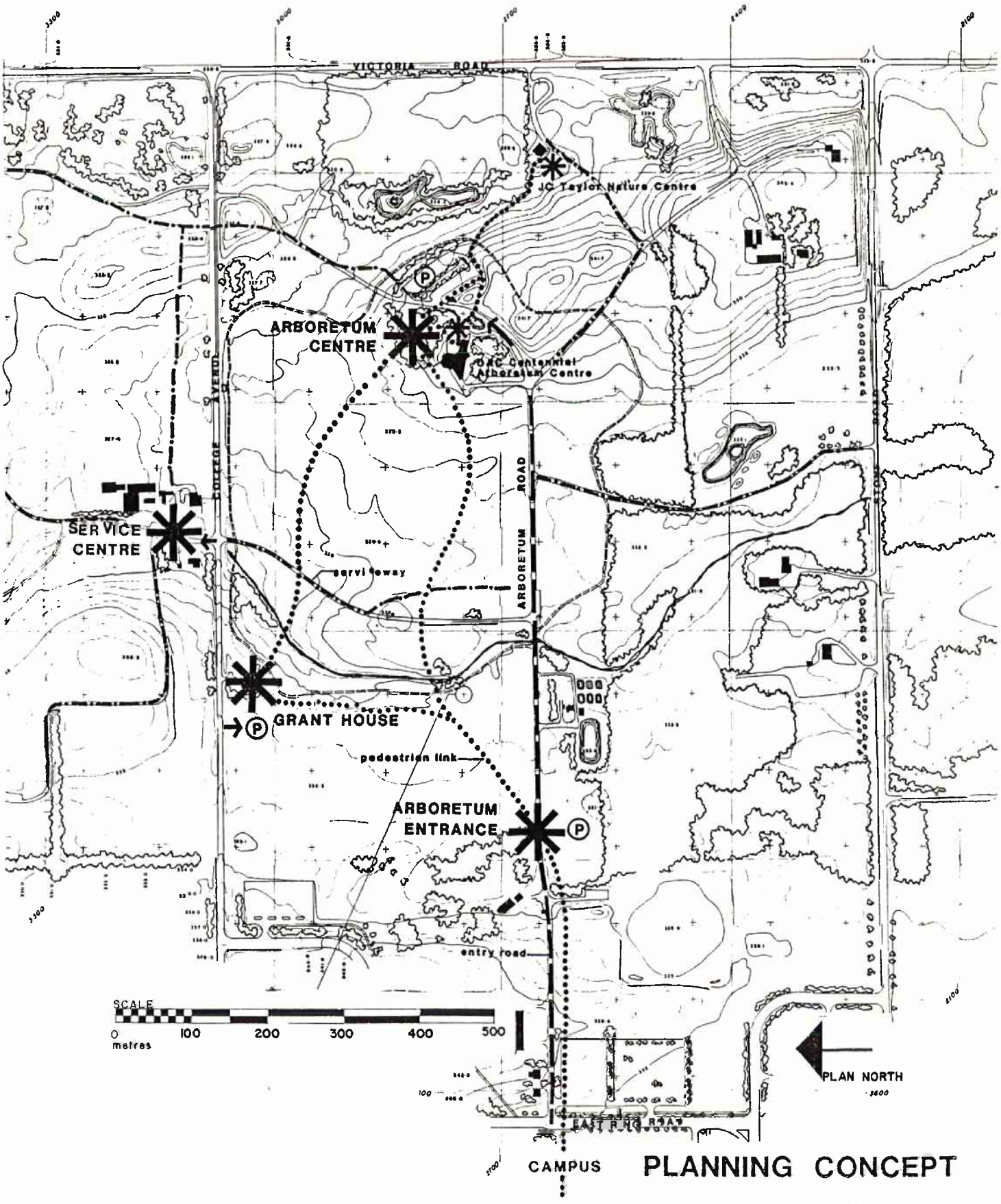
Nodes 1, 2 and 4 are most central to University research, educational administrative and maintenance requirements. Node 3, the Grant House, provides a unique focus for increased public use, support and involvement. The location allows for direct access and appropriate development opportunities while minimizing conflicts with university programmes. It is proposed that the capital and operating costs for the Grant House be funded by the public.

The circulation system includes:

1) The main entry road
2) Grant House vehicular access
3) Major pedestrian link to campus and among Nodes 1, 2, and 3
4) Secondary pathway system (including collection and interpretive walkways)
5) Service way system
6) Trillium Trail
7) Future pedestrian link to city system.

Realignment of portions of the Trillium Trail and some service roads are recommended to enhance the visual quality and function of the Arboretum's circulation system. The provision of a bridge over College Avenue near Victoria Road is a desirable long range objective which should be undertaken at such time as the City of Guelph widens or otherwise improves College Avenue in that area.

The recommended changes and additions can be seen through examination of Map 12 and Figure 4.



PLANNING CONCEPT

figure 4

6.4 DESIGN GUIDELINES

6.4.1 NODAL AREA CONCEPTS

Major node area #1 (Arboretum Centre) and #2 (Arboretum Entrance) are considered priorities and are recommended for early development. The following plan, "Arboretum Centre", illustrates a preliminary concept for meeting programming objectives outlined in Section 6.2. The plan emphasis is on outdoor circulation and visitor orientation.

The second plan, "Arboretum Entrance", stresses improvement of the entry experience, the pedestrian linkage to the campus and visitor orientation.

6.4.2 STANDARDS AND AMENITIES

It is recommended that uniform standards be developed for site architectural elements and amenities.

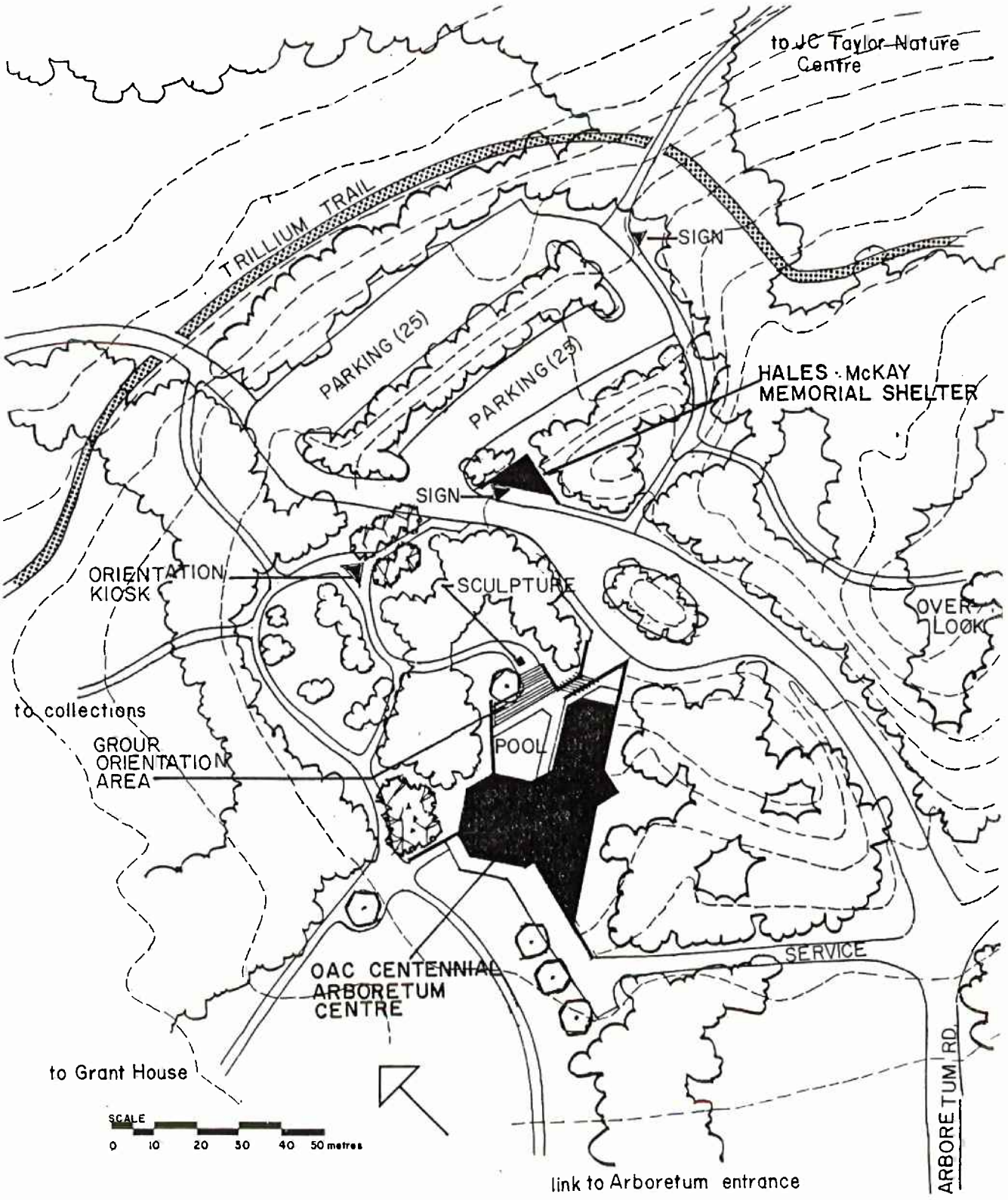
- Nodal Areas: Each major area should retain a design theme or character. For example, Area #1, Arboretum Centre, should reflect the materials and character of Moriyama's structures. Area #3, Grant House, should be developed in a historic vein.

- Signage: A signage system, unique and appropriate to the Arboretum should be developed. Factors to be considered are character, durability and the ability to fabricate and maintain on-site.

- Benches: A standard, comfortable bench; commercially available, should be selected and located at orientation areas, within collections and along major pathways.

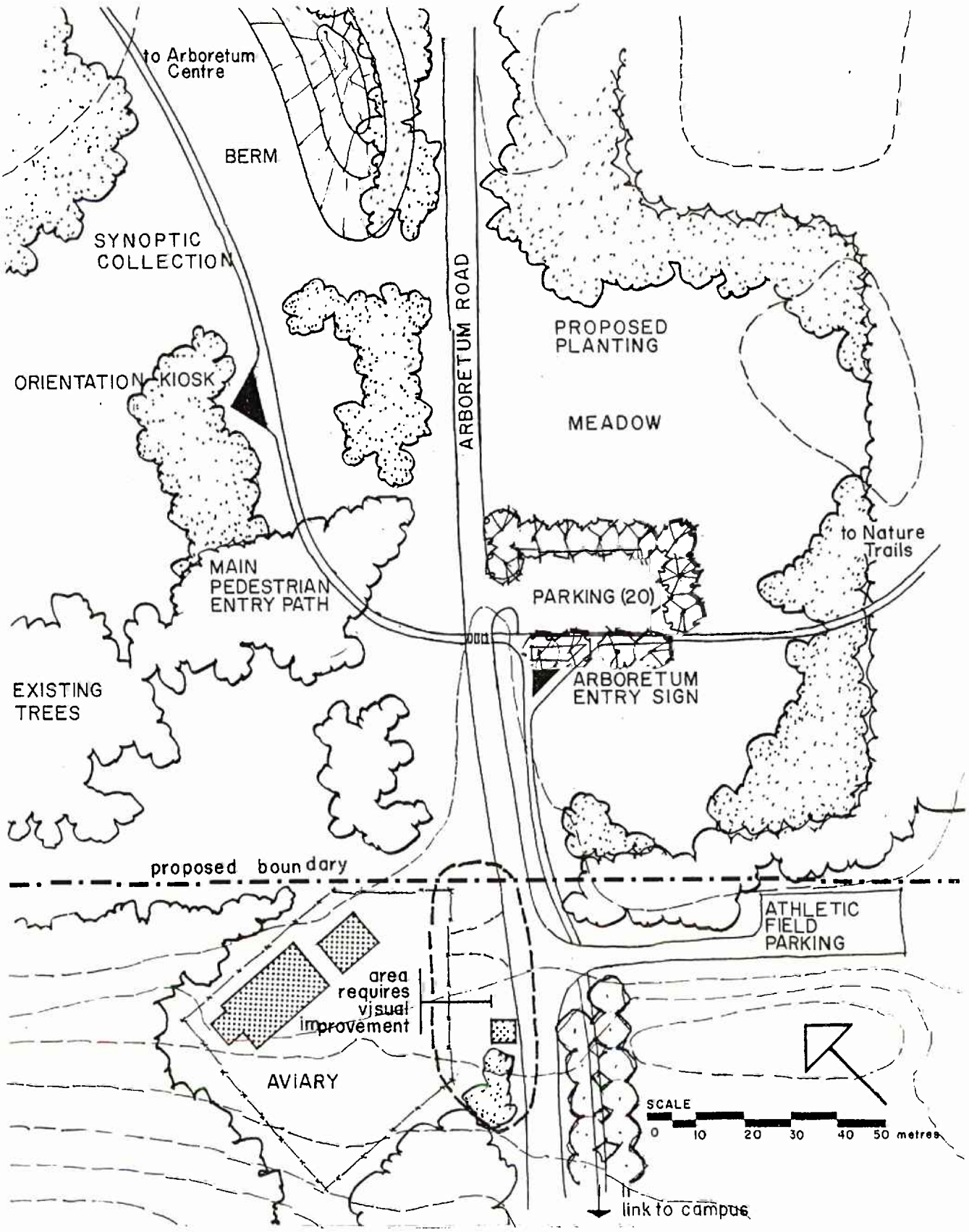
- Donor identification: A system for recognizing donor contributions should be developed related to benches and other architectural features. In the development of the Long Range Plan, it is recommended that architectural features be used as a medium for donor recognition rather than individual trees.

- Art objects: Appropriate works of art shall be encouraged within the Arboretum. In general, placement would be expected in major nodal areas or within more manicured collections. Each piece must be reviewed on its own merit for general acceptability and suitability of location (see Art policy).



ARBORETUM CENTRE NODE 1

figure 5



ARBORETUM ENTRANCE NODE 2

figure 6

6.5 PHASING

Phasing of the plan is proposed over a 15 year period. Within the Five Year Plan (1986-1991), emphasis is placed on development within the Arboretum Centre Node (#1), the Arboretum Entrance (#2), improved pathway systems, the redesigned synoptic collection, priority collection development and framework plantings.

The final ten year period of the plan would address the Grant House Node (#3), the bridge over College Avenue and the completion of paths and collections.

The Capital Projects are itemized in Appendix F. Capital costs under the Five Year Plan are projected to be $213,000 (1986$), and $308,000 (1986$) during the final ten years for a grand total of $521,000 (1986$).

7.0 OPERATIONAL PLAN

7.1 ORGANIZATION

7.1.1 STATUS AND POSITION WITHIN THE UNIVERSITY

A thorough review of the Arboretum's current position and administration within the context of the University of Guelph was undertaken by the Steering Committee. An examination of existing and potential programmes indicated a high level of participation from the total University community and the general public. The User Surveys suggested general support for "Service" oriented activities such as cultural events, nature appreciation, jogging and the use of the Centre as a mini-conference facility.

Educational and Research users also includes a broad spectrum of the University faculty. Although the Arboretum has served as an extremely important resource unit for OAC (especially Horticulture, Landscape Architecture and Environmental Biology), the Steering Committee is of the opinion that the true focus of the facility is University-wide in the identified areas of Education, Research and Service to the Community.

At the same time, the Arboretum has not enjoyed financial support within OAC over the past five years that would provide for its full potential. Present constraints within OAC could further jeopardize existing programmes and the completion of the collections.

In recognition of the above considerations, the Steering Committee recommends that the Arboretum be repositioned within the University administration to report directly to the Vice-President, Academic, as a University-wide Academic Resource and Service Unit. It is further recommended that an Advisory Committee be established reporting to the Vice-President composed of the Deans from OAC, Biological Science and Arts.

7.1.2 STAFF STRUCTURE AND ADMINISTRATION

Following a review of the Arboretum's staffing and management structure, a revised Organization Chart was developed as illustrated on the following page. The changes recommended by the Steering Committee were a response to:

1) achieve a better balance of expertise with a professional staff that can effectively deal with research, educational, developmental, maintenance and administrative requirements;

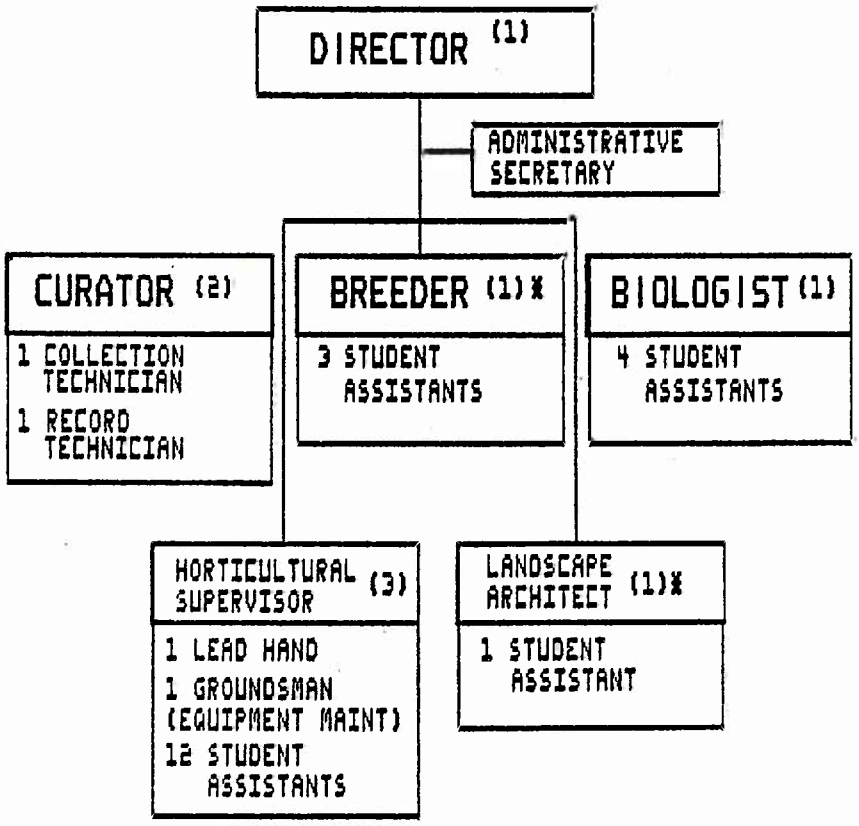
2) provide an improved, more efficient integration of faculty resources through joint appointments; and,

3) accommodate the more extensive facilities and programmes envisioned over the next fifteen years.

The major changes include the addition of two new professional positions, a Breeder (research orientation) and a landscape architect (development). It is proposed that all the professional positions, except Curator, hold joint faculty appointments (1/2 time), with appropriate academic units on campus. The Curator would remain a full-time position providing continuity within the professional staff. It is anticipated that the Curator would teach approximately one course per academic term to offset salary costs and to provide a strong connection to the Unviersity. The net increase in salary costs under this model would be negligible.

The other change would be an increase in temporary student support staff to assist in the projected increases in maintenance and development.

PROPOSED ORGANIZATION CHART



(1) FACULTY, CROSS APPOINTMENT (1/2 TIME)
(2) PROFESSIONAL POSITION WITH TEACHING RESPONSIBILITIES
(3) TECHNICAL POSITIION
* NEW POSITION

figure 7

Advisory Committees

It is recommended that five formal advisory committees be established to guide policy and management of the facility.

Arboretum Advisory Committee (Internal): This committee would be made up of the Deans of OAC, Biological Sciences and Arts and would advise the Vice-President, Academic, on the broader University educational, research and service functions of the Arboretum.

Arboretum Advisory Committee (External): The external committee would be made up of senior people from appropriate related institutions, the City of Guelph, the public at large and special interest groups that would report to the Director on such issues as public use, promotion and outside funding.

Arboretum Research Committee: This advisory committee is to assist the Director in coordination of research activities and would be made up of representatives from the following Departments and Schools:

Botany
Environmental Biology
Horticulture
Landscape Architecture
Zoology

Arboretum Education Committee: To develop appropriate means for future use of existing facilities and to ensure that new facilities (collections or demonstrations) are put to efficient use, an Advisory Committee to include the Director and Curator plus representatives from Botany, Horticulture, Landscape Architecture and Environmental Biology will be formed. This Committee's central mandate will be to develop ways and means for increasing the use of the Arboretum in academic teaching.

Arboretum Development Review Committee: This technical review committee would be responsible for monitoring the implementation of the Master Plan and review of detail design proposals. Members of this committee would be drawn from Landscape Architecture, Horticulture, Environmental Biology, Physical Resources and would include the Director of the Arboretum.

7.1.3 FIVE YEAR PLAN

Is is proposed that the Arboretum structure operating and development programmes within the context of a Five-Year Plan. The reporting format should clearly separate operating costs from capital development and provide appropriate sub-headings (see Section 7.3 for details).

7.2 PROGRAMMES

Existing and potential future educational and public interest programmes were reviewed and evaluated with Arboretum Staff. Current public programmes serve over 7,000 people per year.

It is recommended that present environmental education and cultural programmes be maintained. It is also recommended that new programmes related to horticultural applications be investigated for future consideration. Academic programmes should be offered through the cooperation of existing units such as Continuing Education to avoid duplication of resources.

7.2.1 CURRENT PROGRAMMES - April 1, 1985-March 31, 1986

Objectives
The underlying goal of natural history interpretation is to instil in its participants an environmental* conservation ethic. This can be achieved by facilitating participant gains in appreciation and awareness of their environment through interpretive methods which reveal meanings and relationships with the environment.

* there is no attempt to differentiate "natural and non-natural" environments.

Facilities
J.C. Taylor Nature Centre - Built in 1978, the interpretive centre is situated on a 165h site within the campus of the University of Guelph. The building is 1799 sq. ft. and contains one main display/activity room 10.9m x 4.5m, a puppet theatre, staff office and storeroom 3m x 2m, a maple sugar shack 6m x 4m with 2' x 6' woodfired evaporator, attached passively heated greenhouse 10m x 4m, two composting toilets. The basement contains work space 19.9m x 2.5m, storage 5m x 2.5m, and office 5m x 2.5m. Displays in the room are seasonal, constantly changing and designed to interpret the natural history of the area. Animals on display include: collared dove, rabbit, garter-snake, snapping turtle, frogs (in season), trout, deer mouse, beehive and great horned owl. The building is pine board and batten; immediately surrounding the centre is a variety of habitats: maple/beech forest, two old fields, backyard habitat display area and hedgerows.

Other interpretive facilities include:
(i) self guiding interpretive nature trails:

Seasonal and thematic guides are available for each trail. The Sensate trail has recorded guides.

Victoria Woods Trail:	loop
Victoria Woods Trail:	loop
Sensate Trail:	loop
Victoria Pond Trail:	loop
Col. John McCrae Trail:	linear
Wild Goose Woods Trail:	loop
Swamp Walk Trail:	linear

(ii) wildlife hide

(iii) boardwalks: 100m, 150m and 300m sections.

1. **Public Programmes** The 'Public Programmes' are made up of a series of nature interpretation programmes (including one specifically of horticultural interest) for the University and City communities. The programmes are offered at various times: weekends; weekday evenings.

   A. **Sunday Afternoon Walks:** A series of naturalist led walks for the family along the nature trails. Walks begin at the J.C. Taylor Nature Centre at 2:00 p.m.:

May 12 - June 23, 1985-(7	programmes)
June 30 - Aug. 25, 1985-(9	")
Sept 29 - Dec. 1, 1985-(10	")
Jan. 12 - Mar. 2, 1986-(8	")
TOTAL =	34 PROGRAMMES

   B. **Wednesday Evening Excursions:** Aimed mainly at adult audiences, these naturalist led walks occur during the spring/summer season on alternate Wednesday Evenings. Examples of themes: Trees and Shrubs, Summer Fields and Spring Birds. May 8 - August 28, 1985-9 programmes.

   C. **Concerts With Guided Walks (Arboretum Days):** A programme series co-sponsored with the Concert Management, Department of Music. These programmes are aimed for adult and family participation to provide an opportunity for the "cross fertilization" of interests, i.e., the arts and natural history. February, May and October - 3 programmes.

   D. **Feature (Theme) Programmes:** We offer a wide variety of nature interpretation programmes throughout the whole year. Examples of the themes of these programmes: Bird Surveys, Tree Identification, Maple Syrup, Edible Wild Plants. Some programmes require registration and are aimed at adult participation, e.g., Edible Wild Plants, while other programmes are completely open and are attended by a wide range of ages.

Number of feature programmes: 1985-86=	24
Total number of programmes:	70
Participation (approximate):	2300

2. **School Programmes:** Programmes are offered during the week, throughout the year. The activities are related to the curriculum requirements of the various grade levels and the season offered. Programmes are offered to preschool, elementary and secondary school classes in both English and French.

Number of classes: 108
Number of participants: 3,781

3. **Interest Groups:** An offering of a wide variety of nature interpretation for groups of all ages. Examples of groups: naturalist clubs, adult clubs, brownies, cubs, guides, scouts, 4-H clubs.

Number of groups: 37
Number of participants: 1,205

4. **Professional Development Programme:** The interpretive biologist has an on-going programme of developing effective interpretive techniques and programmes. These innovations are disseminated to others through a number of Professional Development Seminars. Many of these seminars are offered in cooperation with the Secondary School Liason Department, Office of the Registrar.

Number of programmes: 5
Number of participants: 223

5. **Extension Programmes:** These programmes consist of seminars in natural history which are given to outside groups e.g., Horticultural Societies, Naturalist Clubs, Service Groups. The value of these programmes is the exposure of the Arboretum to non-attending people/groups.

Number of seminars: 14

6. **Co-operative Education Programmes:** Secondary students with a demonstrated interest in the Biological Sciences work in the nature interpretation programme on a 1/2 day basis for four months. Our requirements for these students is a research project.

Number of students: 2

7. **Teacher Training:** Students from Colleges of Education carry out internships and practice teaching sessions, primarily with our school groups.

Number of students: 2

TOTAL PARTICIPATION IN PROGRAMS, APRIL 1, 1985-MARCH 31, 1986: 7,509

Staffing:

Full-time. Permanant
One position: Interpretive Biologist.

Winter Semester: Jan. to mid April
Part-time: Interpretive Naturalists:
Weekends: working one in three
3 positions.
Weekdays: working various mornings and afternoons
6 positions.
Plus 25 volunteers (in-course students).

Summer semester mid April to August	Part-time:	Weekend: working one in two 2 positions (see weekdays)
	Weekdays:	2.5 days + 1 weekend I 2.5 days + 1 weekend I - 2 positions 5 days - 1 position - temporary full-time O.C.A.P. - 1 position Queen's University - 6 week internship.
Fall semester Sept. to Dec.	Part-time:	Weekend: working one in three 3 positions
	Weekdays:	various mornings and afternoons 5 positions 8 weekend positions 13 part-time weekdays 1 temporary full-time weekdays 25 volunteers.

7.3 BASE BUDGET AND PHASING

7.3.1 BASE BUDGET

In 1985-86 Base Budget for the Arboretum was approximately $386,950 of which $46,500 was funded by a Provincial MNR grant with the remaining $340,450 from OAC (MCU funds). A budgeting format was developed (see Appendices F and G that establishes an Operations Budget and a Capital Budget. The Operations Budget includes personnel costs, maintenance and research, equipment and miscellaneous expenses. The Capital Budget has breakdowns for planning, engineering and development.

7.3.2 FIVE-YEAR BUDGET

A proposed Base Budget was developed incorporating recommended capital projects, changes in organization, increased telephone and office costs and a greater commitment to maintenance and research to meet projected needs. The Steering Committee recommends that the new Base Budget be phased in over the period of the Five-Year Plan.

The Base Budget for the 1990-91 year is projected at $479,000 in 1986 $ (see Appendix G). This increase includes a Capital Budget of $213,000, to be expended during the period of the Five-Year Plan (see Appendix H) for the list and phasing of Capital Projects). The other major increase results from additional temporary staff related to maintenance, research and design activities.

The Five-Year Plan Budget in 1986 dollars is projected as follows:

1986-87:	$406,350
1987-88:	$446,200
1988-89:	$459,300
1989-90:	$471,900
1990-91:	$479,500

The figures represent gross funding requirements for the operation and development of the Arboretum. Under the Plan (see Section 7.7, Funding) it is proposed that outside funding be secured for Capital Projects thus reducing University support by approximately $213,000 over the first five-year period.

7.3.3 LONG RANGE BUDGET

A long range budget for Capital Development was prepared and is detailed in Appendix H. In 1986 $ the projection for Capital Costs are as follows:

1986-1991 (Five-Year Plan)	$213,000
1991-2001 (Long Range)	308,000
Total	521,000

The projects are discussed in greater detail in Section 7.6.

7.4 POLICY

7.4.1 RESEARCH

The overall policy of the Arboretum is to encourage research, biological or otherwise, within Arboretum properties provided that it falls within the Goals and Objectives of the Arboretum.

It is important that the Director of the Arboretum be kept informed about research activities. The information required by the Director includes:

a) the time of inception of the research, the intended utilization of Arboretum professional time and/or use of Arboretum facilities and resources.

b) regular, annual reporting of the progress of the research and its probable duration.

c) the non-Arboretum personnel involved.

To assist the Arboretum Director in coordination of research activities a "Research Advisory Committee" will be constituted to include the following departments and schools:

Botany
Environmental Biology
Horticulture
Landscape Architecture
Zoology

The committee, composed of representatives from each of the above, will meet, at least semi-annually or more frequently if required to review, and discuss Arboretum research activities and to recommend procedures to enhance these activities.

Research activities ongoing at the Arboretum can be categorized as In-house Research and Co-operative Research. These are discussed below.

In-house Research
In-house research, initiated by Arboretum professionals and closely related to Arboretum operations and stated goals.

This type, tied closely to the operation and development of the Arboretum, includes the following areas of investigation:

Biosystematic Research.
Plant Improvement and Evaluation Research.
Landscape Planning and Design Research.
Research in Public Education in Nature Interpretation.

a) Biosystematic Research
This entails the naming and identification of species as well as hybrid recognition on which the value of the collections depends. The study of sexuality and pollination of woody plants as well as the knowledge of distribution patterns, site preferences and the associated flora is basic to the recognition of appropriate provenances (biological races), and the development of a suitable acquisition policy for the Arboretum collections.

b) Woody Plant Improvement and Evaluation

Woody Plant Improvement
Observations and recordings of growth (height, diameter, crown structure, flowering, fall colour, etc.) of species and hybrids within arboretum collections are essential for the development of improved woody plants.

New and better plant materials for landscaping, forestry and wildlife management can no doubt be found, as both the use of native and exotic plants in these areas at present has its origin in selections made in Europe and the U.S.A. under site conditions very different from ours. Although some species are not "new" to Canada, superior stock may be found through the growing of seeds from provenances hitherto not tested in our area.

Promising material discovered should be selected for evaluation under a variety of site conditions within and outside the Arboretum, a process which may require additional seed introductions or controlled hybridization.

Evaluation Research
The Arboretum has since its inception participated in the evaluation of new varieties as part of cooperative studies by other institutions (Agriculture Canada, a.o). This work, which is essential before new introductions to industry can be justified, should be continued along with the evaluation of locally selected material. However, with regard to the latter, research must also be done on propagation and nursery practices ranging from seed germination and storage to transplanting and cultivation. The Arboretum propagator is already involved in the collection of propagation data on a great number of woody plant species hitherto not cultivated in these parts. In order to accomplish the work with the international seed exchange, information on seed storage conditions and shipment conditions are also collected. Low survival of shipped seed lots has encouraged this type of research data collection, which should be of equal value to industry and researchers.

c) Landscape Planning and Design Research
The variety of sites and plant materials in the Arboretum, paired with variations in goals and purposes of collections and related areas offer challenges in research with regard to landscape architecture. Research areas include landscape inventory; analysis and planning; record keeping and planning systems (CAD); and collection design. This research has an important contribution to make toward the development of an institution of excellence, and, is believed to be an essential part of the internal ongoing programme. The overall design criteria for the Arboretum must be followed up by appropriate designs of small areas within the overall framework in order to create a satisfactory whole.

d) Research in Nature Interpretation and Public Teaching
The operation of the Arboretum Nature Interpretation Programme, centred in the J.C. Taylor Nature Centre requires up-to-date insight into the visitors' educational background and desires. Since the spectrum of visitors covers everybody from preschoolers to senior citizens, with or without physical or mental handicaps such insights can only be obtained through an ongoing research activity involving feedback from various types of surveys and the systematic collection of experiences. Without the continued experimentation with varied visual display techniques and oral presentation models, the programme cannot continue to show the leadership for students of nature interpretation presently well in place, and would stagnate.

Costs of completing the research will be borne by the Arboretum budget and/or by grants or contracts solicited specifically for the research. The latter funds (grants or contracts) may provide the stipend(s) for a post-doctoral fellowship or to a graduate student(s).

Cooperative Research
Cooperative research is not necessarily related to Arboretum operations, but involves Arboretum professionals and/or properties and faculty or professionals from the University of Guelph or other institutions or agencies.

Two types of cooperative research can be recognized:

a) Arboretum professionals working with non-Arboretum professionals and,

b) non-Arboretum professionals conducting research on Arboretum properties, without the direct involvement of Arboretum professionals.

The two circumstances for research work require separate specific policies and arrangements:

Research Involving Arboretum Professionals and External Faculty or Professionals
The costs of completing the research will be borne by the research grant or contract involved except for operations which are normally the responsibility of the maintenance personnel of the Arboretum.

The Arboretum will seek supporting finances for research of particular interest to Arboretum professionals. For example, funds might be solicited from University and/or non-University sources to pay the stipend of a Post-doctoral fellowship. The efforts of such a Post-doctoral fellow would be, specific to a research project, and, such a person would be responsible to the Arboretum director.
Acknowledgement of the involvement of Arboretum facilities and resources in any ensuing publications or products would be expected.

Research Not Involving Arboretum Professionals But Conducted on Arboretum Properties
Acknowledgement of the involvement of Arboretum facilities and resources in any ensuing publications or products would be expected. Any costs in completing the research will be borne by those conducting it, including any work completed by Arboretum maintenance personnel.

7.4.2 A POLICY STATMENT ON EDUCATION FOR THE ARBORETUM

A primary purpose of the Arboretum is in education in the broadest sense. Hence, education, through the use of Arboretum resources, ranges from nature interpretive programmes for school children in Wellington County on maple syrup production through to the academic utilization of Arboretum collections in post-graduate programmes. Although interest is centred on woody plants, a wide range range of educational activities are pursued, i.e. the use of plant material in fine art.

However, a central role of the Arboretum in education is as a supporting facility for academic teaching in undergraduate and graduate programmes ongoing in "plant-oriented" departments.

Thus, a general policy of the Arboretum is to encourage the use of its facilities in any educational process provided that it falls within the official "Goals and Objectives" of the Arboretum.

Policies more specific to the role of Arboretum in both academic and non-academic education include the following:

Academic

a) The Arboretum will foster an increased use of Arboretum collections and demonstration areas in academic teaching.

b) The continued use of "unmanaged" areas of Arboretum properties in academic teaching and involving Arboretum professionals and faculty from Botany, Environmental Biology and Zoology, will be encouraged.

c) The Arboretum will foster the continued use of its facilities and resources by the Fine Arts Department and the Department of Music.

To develop appropriate means for developing the future use of existing facilities and to ensure that new facilities (collections or demonstrations) are put to efficient use an advisory committee to include the Arboretum director and curator plus representatives from the departments of Botany, Horticulture, Landscape Architecture and Environmental Biology will be formed. This committee, advisory to the director, would meet three times per year or more frequently if necessary. Its central mandate will be to develop ways and means for increasing the use of Arboretum facilities in academic teaching.

Non-academic

a) The established and ongoing programme of non-academic education in nature interpretation which involves school students and the general public will be fostered and encouraged by the Arboretum.

b) Appropriate procedures will be followed to determine if programmes can be developed, in cooperation with the School of Continuing Education and Part-time Studies, to provide public educational services in areas such as Arboriculture and Woody Plant Culture.

c) Appropriate procedures will be followed to ascertain the feasibility of providing a public educational service on woody plant culture, e.g. a telephone service or newsletter.

d) Appropriate procedures will be followerd to determine whether Arboretum resources can be used in the future for apprenticeship programmes in e.g. arboriculture, in association with the Diploma course at Guelph.

e) The current non-academic but cultural use of Arboretum resources by Fine Arts and the Department of Music will be encouraged to continue.

7.4.3 CONTRIBUTIONS

A comprehensive policy is required for donations of funds, materials, objects of art, etc. The policy must be developed in concert with fund raising programmes and the evolution of a "Friends of the Arboretum" organization.

Guidelines as follows:

- Small (or large) cash donations - non-assigned. To be deposited in the Arboretum Development Fund. Acknowledge by letter of thanks.

- Cash donations - assigned use. Must be meaningful in size to merit recognition. Must provide for development and maintenance (endowment). Must conform to the Master Plan. Official acknowledgement provided onsite.

7.4.4 ARBORETUM NATURAL AREAS

Tracts of unmanaged areas and small water bodies, within the Arboretum, have been and will continue to be used extensively by academic teaching programmes and for public education through the nature interpretation programme. As such they represent a valuable, well used resource for the University and community which is essentially cost-free in terms of maintenance.

The undeveloped areas of the Arboretum (such as Victoria Woods, Wild Goose Woods and Southwoods) are to be unmanaged and made available for nature interpretation, environmental education and appropriate research. These lands are to be zoned "uncultivated". Agroforestry management and demonstration, as an example, is best conducted on other available University woodlot holdings.

7.4.5 THE SELECTION AND PLACEMENT OF ART OBJECTS

1. The University policies regarding art objects aquisition and placement must in all cases be followed. (See policies G.E. 17.0; GE. 18.0 and FI. 5.0 enclosed in Appendix I).

2. Safety, security and maintenance should at all times be considered by the Arboretum Director in consultation with the Curator of Arts for the University. The later is responsible for appropriate insurance, but not necessarily for maintenance of art objects.

3. Art objects can be placed in the Arboretum only with the consent of the Arboretum Director and in accordance with the design guidelines or the general character for specific areas provided by the Master Plan.

4. The siting of art objects shall be subject to a review by the Arboretum Development Review Committee. In exceptional cases, where a desirable art object is unsuited for any of the spaces outlined in the Master Plan, a revised landscape design following a thorough landscape architectural study must be developed before placement can take place.

7.4.6 BICYCLES

Bicycles are considered to be vehicles and as such their use is permitted on the same routes as are publicly accessible by automobiles.

7.4.7 PETS

The policy for control of pets on the University of Guelph Campus applies to the Arboretum lands. Pets must be under the direct control of the owner or custodian and are not to be left unattended. For further information, refer to policy GE 9.0 of the University of Guelph Administrative Policy Guide.

There are several reasons why this policy must be enforced on the Arboretum site. The enjoyment, comfort and safety of Arboretum users could potentially be infringed upon by free running animals. Further, contact between pets and foxes, skunks and other wild animals found at the Arboretum carries the threat of spreading rabies. Should such contact occur, the Arboretum could be subject to a fox control programme.

Positively worded signs informing users that they must control their pets will be installed and maintained.

7.4.8 HOURS OF OPERATION

The Arboretum grounds are open for use from dawn until dusk all days of the year. Buildings are to be open as is current practice and as Arboretum programmes require.

7.5 GROUNDS MANAGEMENT

The following list of grounds management levels codifies a gradation of five maintenance intensities. Collection types to which they apply are indicated.

a) INTENSIVE:
Lawns are regularly mowed to a residential standard.

Pruning is regularly performed for plant form enhancement and/or flower production.

A regular disease and pest control programme is in force.

Applicable to Horticultural collections and demonstrations.

b) HIGH:
Lawns are regularly mowed to a park standard.

Annual pruning for plant form and/or flower production, is performed.

Disease and pest control measures are undertaken as required.

Applicable to Synoptic collection.

c) MEDIUM:
Lawns are mowed to a short meadow standard.

Pruning is performed to correct structural or disease problems only.

Disease and pest control measures are undertaken as required.

Applicable to Shrubs and Minor Tree Families and Coniferous Trees and Shrubs.

d) LOW:
Paths and openings are mowed in areas of longer grass.

Pruning is performed to correct structural or disease problems only.

Disease and pest control measures are undertaken as required.

Applicable to Deciduous Tree Families.

e) MINIMAL:
No maintenance activities are preforemd except as required to direct natural processes, relieve management problems due to external influences, or prevent deterioration of paths and similar infrastructural elements.

Applicable to woodland and other uncultivated areas.

7.6 LONG RANGE NEEDS

7.6.1 CAPITAL DEVELOPMENT

The listing of Capital Projects is included in Appendix H. Projects included 1) Support Facilities, 2) Collections and Demonstrations and 3) Framework and Open Space Development.

The higher priority projects are included within the Five-Year Plan and involve improvements at Arboretum Centre (Node #1), Arboretum Entrance (Node #2), Major Pathway and Serviceways, Synoptic and other Collections, and Framework or Open Space Development.

Longer term projects include the development of the Grant House (Node #3) public use area and the completion of Collections and Pathways.

7.6.2 EQUIPMENT

The following tables outline an inventory of both maintenance and office equipment. The information includes date of purchase, original cost, date of replacement and future cost (where known).

TABLE 8: ARBORETUM EQUIPMENT INVENTORY (MAINTENANCE)

	Date of Purchase	Original Cost	Date of Replacement
FORD TRACTOR '4600' (45 H.P.)	June '76	$ 5900.	1990+
for above:			
CAB	Apr. '80	2848.	
NORTHERNER SNOW BLOWER (2 auger)	Apr. '80	1700.	1990
FORD TRACTOR '2600' (28 H.P.)	Mar. '78	5397.	1995
for above:			
TURF TIRES	Apr. '80	1042.	1990
FLAIL MOWER	Feb. '81	2266.	1991
INTERNATIONAL TRACTOR '354' (35 H.P.) overhauled	June '73	3500.	1995
for above:	Aug. '84	5257.	
LOADER '850'	Feb. '77	1675.	1995
BUCKET FOR LOADER	Feb. '83	650.	1995
TREE SPADE FOR LOADER	Mar. '72	400.	1995
MASSEY LOADER 'MF 11' w/BUCKET	June '74	22500.	Replacement
for above:			Questionable

TREE SPADE	Aug. '76	800.	
STEINER 4 W.D. ARTIC TRACTOR (20 H.P.)	Apr. '82	5942.	1991
for above:			
BLADE	Apr. '83	382.	1991
MOWER (front cut rotary 60")	Apr. '82	1245.	
SNOW BLOWER	Apr. '83	1307.	1991
TRAILER	Apr. '83	596.	1991
BRINLEY CULTIVATOR SPRING TOOTH	Apr. '82	261.	Consider
BRINLEY CULTIVATOR STIFF TOOTH	June '80	175.	For Surplus
TORO ROTARY MOWER GROUNDSMASTER	June '72	5322.	1986-87
USED DECK 72'	Aug. '80	1130.	1986-87
TORO ROTARY MOWER GROUNDSMASTER 72'	Mar. '80	7347.	1990
GRAVELY WALK BEHIND TRACTOR (10 H.P.) (overhauled)	May '74	1051. used	1990
for above:	Mar. '83	450.	
SWEEPER	Nov. '85	1650.	1990
ROTO TILLER	Aug. '81	652.	1990
ROTARY PLOW	Apr. '82	181.	1990
TORO 3 GANG REEL MOWER (72")	Apr. '82	250. used	
E-Z-GO GOLF CART/SERVICE VEHICLE	Jan. '79	4495	1987 Consider Alternative
TRAILER TYPE SPRAYER 'F.M.C.' (100 GAL.)	Apr. '76	1340.	Indefinite
HUSKY WATER WAGON W/PUMP (1000 GAL.)	Nov. '73	1496.	1994
LAWN BOY PUSH ROTARY MOWER	Apr. '82	326.	1988-89
FORD ROTO TILLER	June '78	275.	1990
RYAN SOD CUTTER	Dec. '83	2750.	Indefinite
SPRAYMOTOR SPRAYER TRAILER TYPE (20 GAL.)	May '72	495.	Replacement Questionable
GREEN MACHINE WEED EATER	June '78	339.	1987
GAS REAPER WEED EATER	Apr. '82	360.	1988
MCCULLOCH 'PRO-MAC 60' CHAIN SAW	Jan. '74	225.	Surplus
STIHL '024 AV' CHAIN SAW	Apr. '84	335.	1994
MASSEY FERGUSON DISC 8 FT.	Horticulture		Possibly Surplus
INTERNATIONAL 3 FURROW PLOW	Horticulture		1995

CENTURY BOOM SPRAYER (150 GAL.)	Apr. '83	1829.	Indefinite will need improvements
M.F. POST HOLE DIGGER			Indefinite
VICON 3 PT. HITCH FERTILIZER DISTRIBUTOR	Apr. '73	356.	1998
HUSKY TRAILER W/CYLINDER FOR UNLOADING	Mar. '75	1389.	1987 Additional one needed
ROLLER 7 FT. LONG (3 PT. HITCH)			Indefinite
HAY WAGON W/RACKS & SEATS FOR TOURS	Mar. '78	380. used	Indefinite
BRILLION GRASS SEEDER (3 PT. HITCH)	Apr. '76	500. used	Indefinite
WEEDONE METER MISERS HERB. APPLICATORS	June ' 75	115.	Should find Alternative
3 PT. HITCH BLADE			Indefinite
CULTIVATOR ADJ. ROW (3 PT. HITCH) 4.	Oct. '85	1650.	2000
HARROWS 3 SECTIONS		used	Indefinite
INTERNATIONAL 3 PT. HITCH REGID CULTIVATOR	Horticulture		soon to be scrap
ELECTRIC HEDGE CLIPPERS	July '78	100.	Indefinite
LINCOLN WELDER (ELECTRIC)	May '76	141.	Indefinite
FORD PRESSURE STEAM CLEANER	Aug. '82	695.	Indefinite
BEAVER-ROCKWELL 10" TABLE SAW	Feb. '78	150. used	Indefinite
ROCKWELL DRILL PRESS			Indefinite
SPEEDAIRE AIR COMPRESSOR	Oct. '76	475.	Indefinite
STANLEY ELECTRIC GRINDER			Indefinite
ASSORTED SHOP TOOLS & SUPPLIES	Replace Yearly as Required		
ASSORTED GARDENING HAND TOOLS & SUPPLIES	"	" "	"
ASSORTED FORESTRY EQUIPMENT	"	" "	"
HERMES ENGRAVING MACHINE		USED	
GRAPHOTYPE LETTER PUNCHER		USED	

TABLE 9: OFFICE/ADMIN/RECORDS SECTION - EQUIPMENT

Existing Equipment

Hardware	Cost	Estimated Replacement Date	Purchase Date
IBM PC (Serial/parallel/clock /color graphics.320k ram/ 2-360k drive)	4100	1988	Jan. 1982
AMDEK 300A VDT	375		"
C.ITOH 8510 A printer	900	1988	"
EPSON FX-185 printer	960	1990	Summer 1985
TALLGRASS 20 Meg. Hardisk (3020) with tape backup	4570	1988	June 1984
Miscellaneous - backup tapes, diskettes, cable	300		
Software			
dBASE III	800		Nov. 1984
Wordstar	595		June 1984
Turbo Pascal	75		Dec. 1984
Wordperfect	200		Jan. 1986

TABLE 10: REQUIRED EQUIPMENT AND COST

Research, Record Keeping and Design Systems

Quantity	Item Description	Price
	HARDWARE	
1	IBM PC-AT/ 512K/ 1.2 MB drive/ 360 drive/ 2 serial ports/ 1 parallel port/ 30MB hard disk/ 80287 math co-processor	7690
1	Thesys FastCard with 2MB RAM expansion	1450
1	Tecmar graphic card	795
1	Zenith ZVM-136 color graphics monitor	850
1	Houston Instruments DMP-52 plotter single pen/ 24" x 36" (DMP 42---$5347 same size)	7490
1	IBM Mouse input device	270
1	Amdek monochrome monitor	295
1	Hercules graphic card	650
1	Filtek uninterrupted power supply (750 watts for max. 20 minutes)	2695
	SOFTWARE	
1	AutoCAD with ADE 3 CAD software	2750
1	Autospooler software (plotter spooler)	695
1	PC-DOS version 3.1	89
1	Lotus 123	250
TOTAL COST (all listed items above)		$25,969

7.6.3 LAND

The Master Plan review included an examination of existing Arboretum boundaries and surrounding land use. The Steering Committee recommends that additional adjacent University lands be included in the Long-Range Plan to satisfy the needs identified by the Goals and Objectives and the proposed physical plan (see Section 6.1.6). The two parcels are as follows:

Cornfield Lands
This parcel is contiguous to the Arboretum on the western side between the access road and College Avenue. This block of land is important for both short and long-term proposals. The land is necessary for the development of an improved entry experience, orientation area (Node Two) and the Synoptic development in closest proximity to the campus.

In the long range, the area is important in establishing and maintaining the visual integrity of the Arboretum as well as providing for the development of the Grant House Complex (Node Three).

The Southwoods Extension
Studies have indicated that the Southwoods complex is an important environmental area within the Guelph urban context. The proposed Guelph Plan identifies portions of the area as worthy for conservation.

It is recommended that the Arboretum boundary be extended to bring more of this unit under the management of the Arboretum to ensure that conservation, management and interpretive goals are achieved.

The above recommended lands are currently under University ownership and therefore would not require purchase.

7.7 PUBLIC INVOLVEMENT

The role of the public in the use, operation and funding of the Arboretum will become increasingly important during the period of the Plan. Information gained from the User Surveys, the Planning Symposium and an assessment of existing levels of involvement were considered in reaching the following conclusions:

- Public involvement plays an important role in the areas of informal use, participation in programmes, volunteer support, funding and general University/Community public relations. Current levels of public involvement should be maintained and increases encouraged over time.

- The concept of a "Friends" organization should be further explored and instituted within the fifteen-year planning period. The mandate of such an organization would be fund-raising, appropriate assistance in programmeme development and delivery, the operation of "commercial" and demonstration activities

associated with the proposed Grant House complex. It is the Committee's opinion that such an organization must be self-supporting and complementary to the Arboretum's Goals and Objectives. It is also felt that such an organization would not be viable at this time.

- Funding: The Steering Committee recognizes that there are funding constraints from University MCU sources that present difficulties in realizing the Long-Range Plan. It is apparent that funding for Capital Works will likely have to come from outside sources. It is therefore recommended that the new Director establish a funding drive for Capital Projects to be administered within an Arboretum Development Fund. Potential sources include the general public, industry and alumni. Funding targets would be approximately $50,000 per year over the first five-year period.

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986

LEGEND

- LESS THAN 5% SLOPE
- 5-10% SLOPE
- GREATER THAN 10% SLOPE
- EXISTING BUILDING
- EXISTING WOODY VEGETATION COVER
- EXISTING PONDS
- STREAM
- PLANNING AREA BOUNDARY
- EXISTING ARBORETUM BOUNDARY

ARBORETUM GRID REFERENCE 2754.6 N, 486.5 E. ELEVATION 331.93

UNIVERSITY GRID REFERENCE

EAST RING ROAD

SCALE
0 100 200 300 400 500
metres

NORTH
PLAN NORTH

Topographic base information taken from aerial survey mapping by MMM Surveys and Consultants Limited, November, 1985.

TOPOGRAPHY & SLOPE

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986

LEGEND

C9 SOIL/DRAINAGE UNIT (see appendix C for description)

TOPSOIL/GRAVEL STRIPPING

FILL AREA/PILE

CULVERT

EXISTING BUILDING

EXISTING WOODY VEGETATION COVER

EXISTING PONDS

STREAM

PLANNING AREA BOUNDARY

EXISTING ARBORETUM BOUNDARY

SCALE
0 100 200 300 400 500
metres

ARBORETUM GRID REFERENCE 2751·6 N, 486·5 E. ELEVATION 331·93

UNIVERSITY GRID REFERENCE

NORTH
PLAN NORTH

Information taken from mapping by Jim Dougan Associates, Guelph, December, 1985.

HYDROLOGY & SOILS

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986

LEGEND

- POOR SOIL DRAINAGE
- SEASONAL FLOODING
- SEASONAL DROUGHT
- AREAS PRONE TO EROSION
- THIN TOPSOIL HORIZON
- EXISTING BUILDING
- EXISTING WOODY VEGETATION COVER
- EXISTING PONDS
- STREAM
- PLANNING AREA BOUNDARY
- EXISTING ARBORETUM BOUNDARY

ARBORETUM GRID REFERENCE 3750 E.N., 466 S.E. ELEVATION 331·93

UNIVERSITY GRID REFERENCE

SCALE 0 100 200 300 400 500 metres

NORTH

PLAN NORTH

VICTORIA ROAD

STONE ROAD

EAST RING ROAD

SOILS LIMITATIONS

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986

LEGEND

SIGNIFICANT OFF-SITE VIEW

TF-V3 LANDSCAPE CHARACTER UNIT
KEY TO DESCRIPTION IN TEXT

CULTURAL FEATURE

LANDFORM FEATURE

WATER FEATURE

HIGH VISUAL QUALITY

MEDIUM VISUAL QUALITY

LOW VISUAL QUALITY

EXISTING BUILDING

EXISTING WOODY VEGETATION COVER

EXISTING PONDS

STREAM

PLANNING AREA BOUNDARY

EXISTING ARBORETUM BOUNDARY

LANDSCAPE CHARACTER UNITS VISUAL QUALITY & SPECIAL FEATURES

8

SCALE
0 100 200 300 400 500
metres

NORTH
PLAN NORTH

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986

LEGEND

- SUITABILITY FOR COLLECTIONS
- SUITABILITY FOR TEST PLOT RESEARCH
- SUITABILITY FOR ECOLOGICAL RESEARCH
- SUITABILITY FOR INTERPRETATION
- EXISTING BUILDING
- EXISTING WOODY VEGETATION COVER
- EXISTING PONDS
- STREAM
- PLANNING AREA BOUNDARY
- EXISTING ARBORETUM BOUNDARY

VICTORIA ROAD

STONE ROAD

EAST RING ROAD

ARBORETUM GRID REFERENCE 2754 N, 4865 E. ELEVATION 331·93

UNIVERSITY GRID REFERENCE

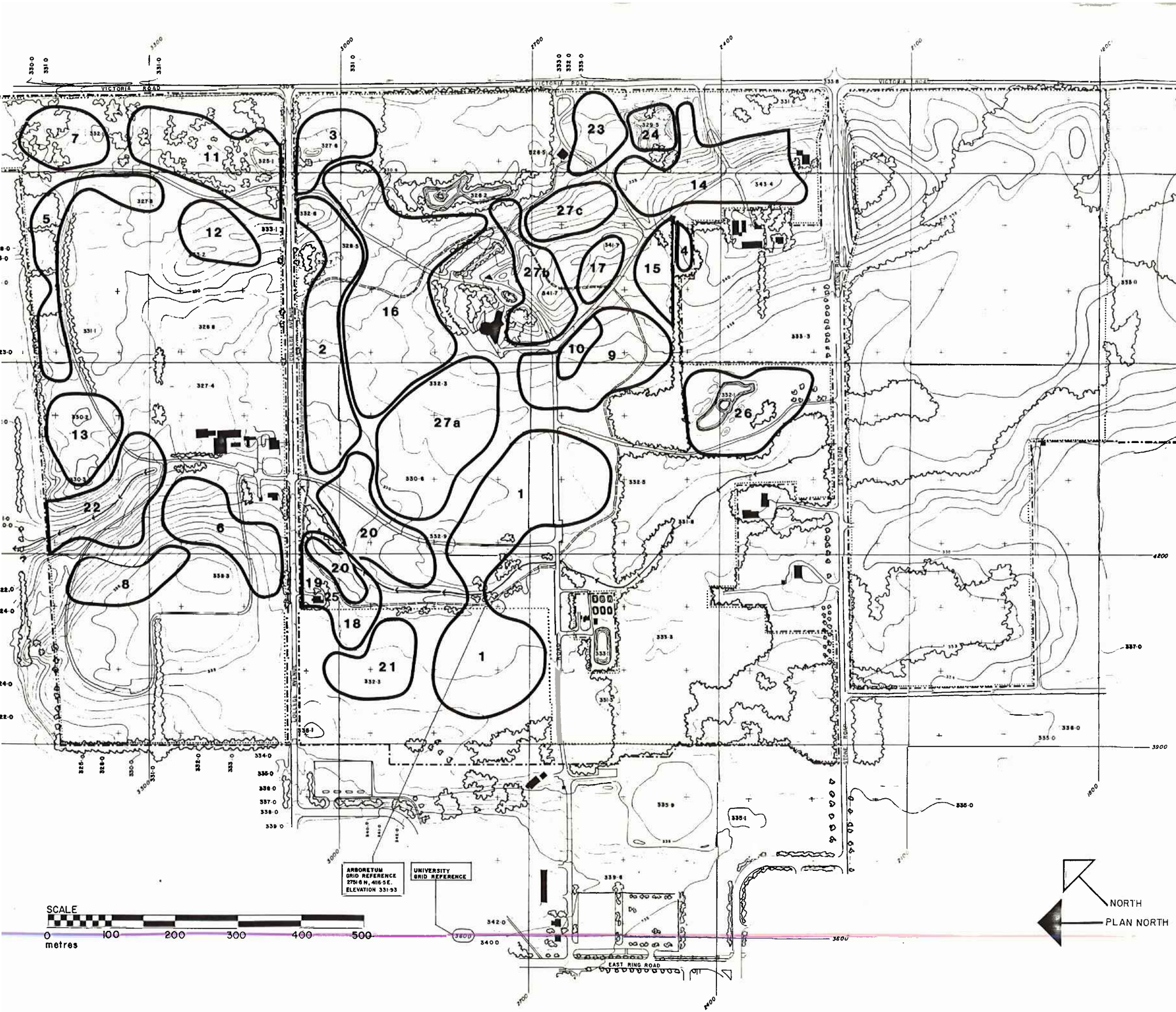
SCALE
0 100 200 300 400 500
metres

NORTH
PLAN NORTH

COMPOSITE SUITABILITY

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986



LEGEND

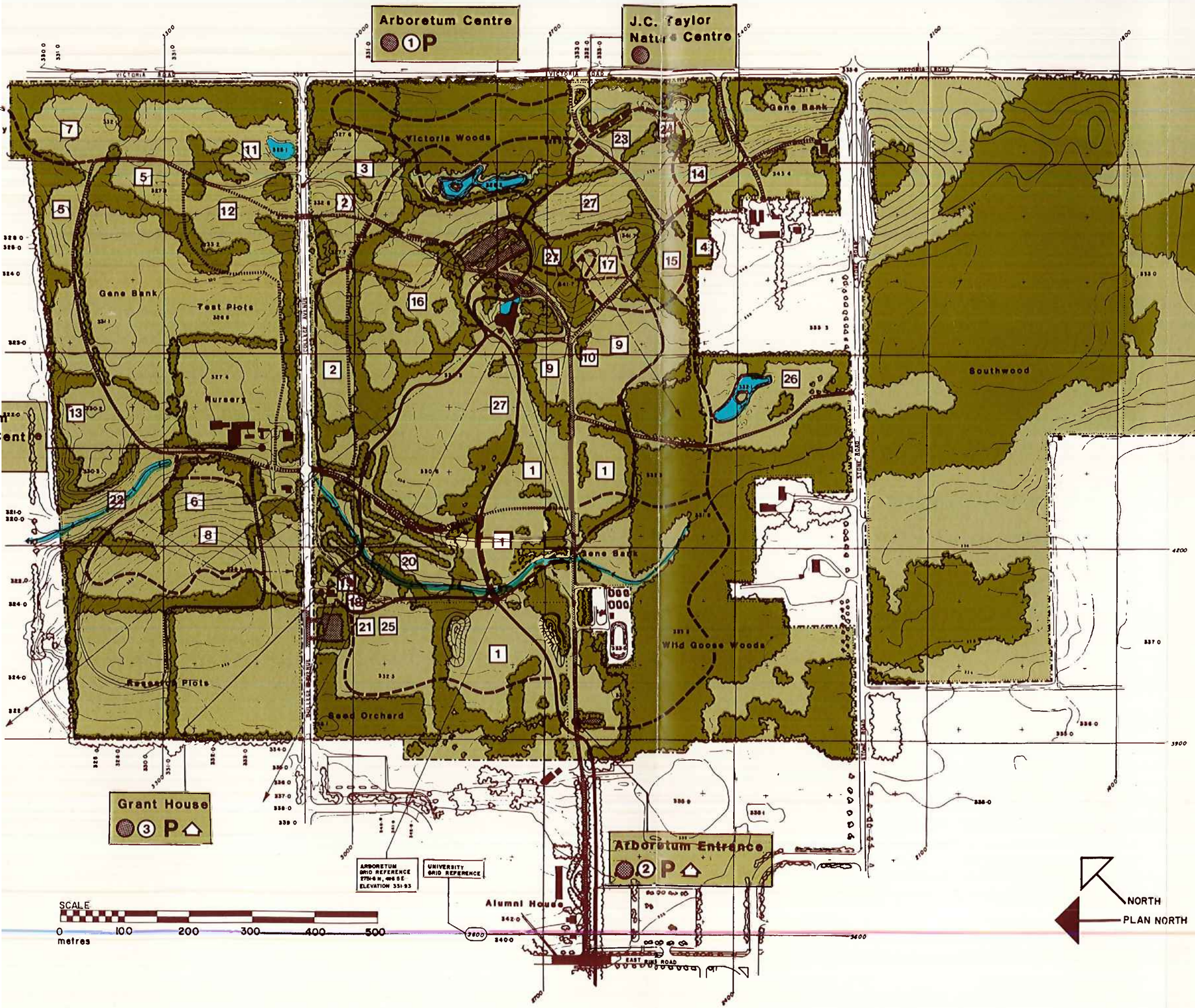
1 SYNOPTIC COLLECTION
2 ACERACAE
3 BETULACEAE
4 ERICACEAE
5 FAGACEAE
6 JUGLANDACEAE
7 LEGUMINOSAE
8 OLEACEAE
9 ROSACEAE
10 ROSA
11 SALICACEAE
12 TILIACEAE
13 ULMACEAE
14 CONIFEROUS TREES
15 DWARF CONIFERS
16 SHRUBS AND MINOR TREE FAMILIES
17 LILACS
18 FORMAL HEDGES
19 VINES AND CLIMBERS
20 STREET TREES
21 EDIBLE NUT TREES
22 FALL COLOUR
23 HABITAT DEMONSTRATION
24 LAND RECLAMATION DEMONSTRATION
25 TOXIC PLANTS
26 CAROLINIAN PLANT ASSOCIATIONS
27a NATIVE TREES & SHRUBS (oak savanah)
27b NATIVE TREES & SHRUBS (upland & lowland)
27c NATIVE TREES & SHRUBS (old field)

EXISTING BUILDING
EXISTING WOODY VEGETATION COVER
EXISTING PONDS
STREAM
PROPOSED ARBORETUM BOUNDARY
EXISTING ARBORETUM BOUNDARY

COLLECTION PLAN 11

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986



LEGEND

1 SYNOPTIC COLLECTION
2 ACERACAE
3 BETULACEAE
4 ERICACEAE
5 FAGACEAE
6 JUGLANDACEAE
7 LEGUMINOSAE
8 OLEACEAE
9 ROSACEAE
10 ROSA
11 SALICACEAE
12 TILIACEAE
13 ULMACEAE
14 CONIFEROUS TREES
15 DWARF CONIFERS
16 SHRUBS AND MINOR TREE FAMILIES
17 LILACS
18 FORMAL HEDGES
19 VINES AND CLIMBERS
20 STREET TREES
21 EDIBLE NUT TREES
22 FALL COLOUR
23 HABITAT DEMONSTRATION
24 LAND RECLAMATION DEMONSTRATION
25 TOXIC PLANTS
26 CAROLINIAN PLANT ASSOCIATIONS
27 NATIVE TREES AND SHRUBS

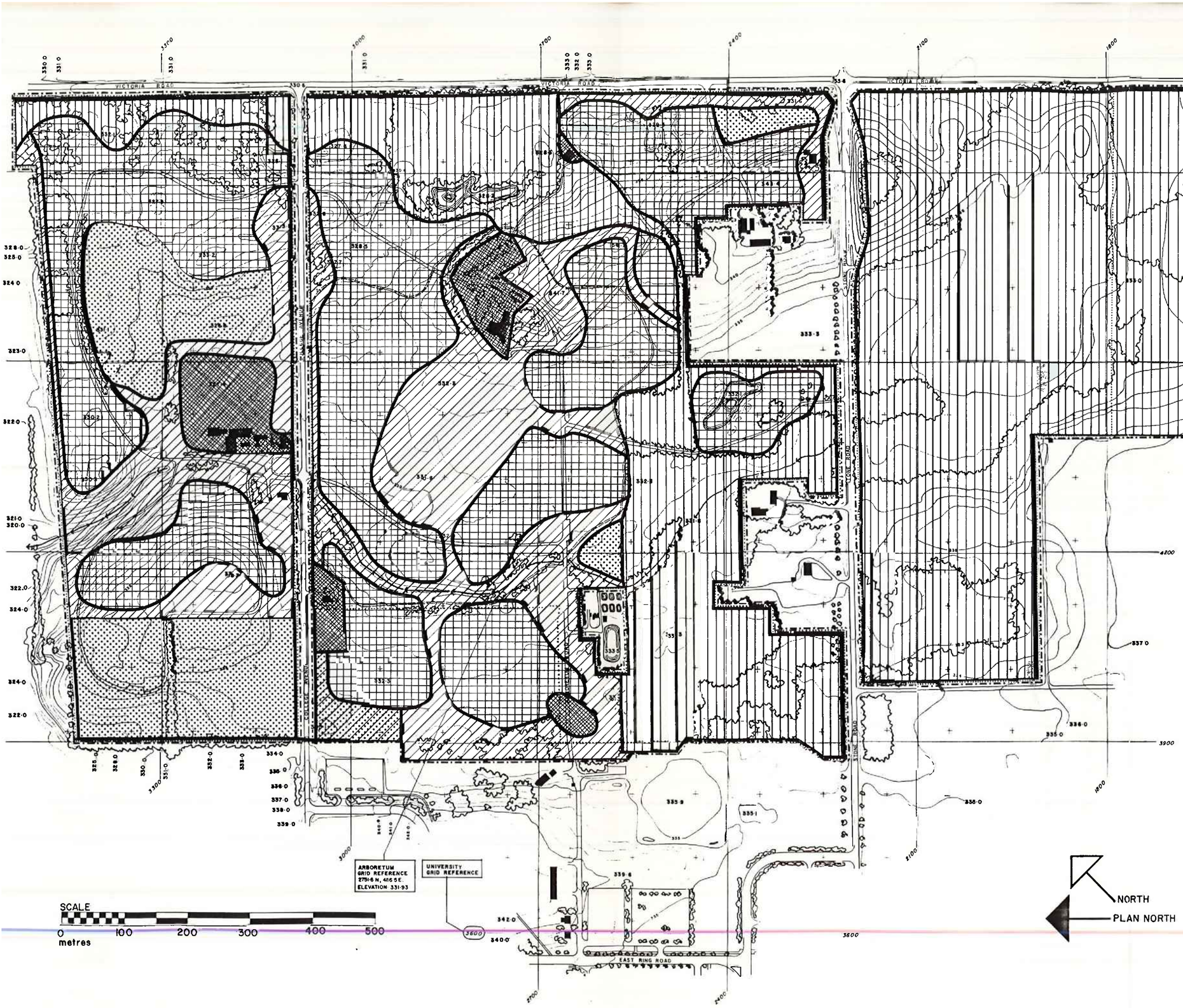
FACILITY
MAJOR NODE
P PARKING
ENTRY FEATURE
PUBLIC ACCESS (VEHICULAR)
PATH/SERVICEWAY
MAJOR PATH
SECONDARY PATH
TRILLIUM TRAIL (FITNESS)
EXISTING BUILDING
FRAMEWORK & WOODED AREAS
EXISTING PONDS
STREAM
PROPOSED ARBORETUM BOUNDARY
EXISTING ARBORETUM BOUNDARY
IMPORTANT VIEW OR VISTA

ILLUSTRATIVE MASTER PLAN

12

UNIVERSITY OF GUELPH ARBORETUM MASTER PLAN

MAY 1986



LEGEND

- COLLECTIONS
- RESEARCH RESERVE
- UNCULTIVATED
- SUPPORT
- FRAMEWORK & OPEN SPACE
- EXISTING BUILDING
- EXISTING WOODY VEGETATION COVER
- EXISTING PONDS
- STREAM
- PROPOSED ARBORETUM BOUNDARY
- EXISTING ARBORETUM BOUNDARY

LAND USE ZONING

APPENDIX A

A chronology of Events and Activities in the History of the Arboretum.

DATE	EVENT
June 1972	The Board of Governors approved plans by architect Raymond Moriyama for O.A.C. Centennial Arboretum Centre. This project was financed largely by University Alumni contributions (as an O.A.C. Alumni Centennial Project) and a contribution from the Ontario Ministry of Agriculture and Food.
September 1972	A Progagation Greenhouse was completed. The unit was purchased with funds donated by Mr. P.A. Fisher, O.A.C. '11.
	An Arboretum Field Day was held for the Ontario Shade Tree Council.
Spring 1974	The Ontario Agricultural College Centennial Arboretum Centre was opened.
September 1974	The Arboretum professional staff was expanded, with the appointment of a curator.
1976	Education and research programs at the Arboretum were expanded with assistance grants from the Ontario Ministry of the Environment. A research co-ordinator and a naturalist were appointed.
	An additional Lord and Burnham greenhouse was added to the headerhouse, and excellent machinery and storage buildings constructed. Tree digging equipment was purchased from Ministry of the Environment Funds. Two Nature Interpretation Trails were completed in Victoria Woods.
1977	The Arboretum Progress Report, 1977, noted the following developments.
	Planning and planting of collections continued. The Seed Exchange, in its seventh year, offered a greater diversity of material.
	A Vegetation Analysis of Arboretum woodlands, swamps and old fields was completed. The study improved data available to Arboretum users interested in these areas for research, class activities and nature study.
	A gravel pit on the property was developed for the study of slope rehabilitation. Several other new research projects were underway.
	A large shadehouse was installed by the Department of Horticultural science.

DATE	EVENT
	The Nature Interpretation program was expanding. Equipment for maple syrup production was purchased. A workshop was held for Wellington County School Board teachers to introduce them to Arboretum facilities.
	Measures were taken to enhance wildlife habitat, and guidelines were established for removal of windfalls in the wooded areas.
April 30, 1978	The J.C. Taylor Nature Interpretation Centre was officially opened. The centre was built as a focal point for the use of Arboretum natural areas.
May 1, 1978	Erik Jorgensen was appointed Director of the Arboretum.
October 1978	The Music Department and the Arboretum hold the first concert in what was to become an annual concert series. The first season was funded by a grant from the Ontario Arts Council, through their Music Outreach Extension Program. The concerts, held in October, February and May, have continued with funding by the Music Department and the Arboretum.
June 1979	The first Horticulture Day was held at the Arboretum, in co-operation with the Guelph Horticultural Society and the Ontario Horticultural Association and the Canadian Rose Society.
	The Arboretum biologist's position, formerly a temporary position funded by the Ministry of the Environment, was made a permanent University position.
1980	The Arboretum began the Ontario Rare Woody Plants Program with grant assistance from the Ontario Ministry of Natural Resources. A decision was made to display plants and distribute seeds on the basis of geographical races. This formal statement and collections policy, designed to further rare plant conservation, is unique in Canada. Activities of the program include distribution surveys, seed collecting for the seed exhchange, and gene bank planting.
May 1981	The sculpture A+ 1980, located on the lawn west of the Arboretum Centre, was unveiled. The installation of the sculpture was a joint project of the Department of Fine Arts and the Arboretum Centre.

DATE	EVENT
	The Ontario Rare Woody Plant Program was expanded to include the preparation of status reports on potentially endangered trees and shrubs, funded by the World Wildlife Fund.
1981	The Rotary Tree Grove Street Tree Collection was established. Development of the collection, designed by Vern Olsen, was a co-operative project of the Arboretum and the Guelph Rotary Club.
September 1982	The Trillium Trail, a 2 kilometer running trail with exercise stations was opened, providing joggers with a safe and scenic place to run. The design and building of the trail was a joint project of the Arboretum, Dr. John Powell of Human Biology, and the Ontario Ministry of Culture.
October 1982	The Hales-McKay Memorial Plaque was dedicated at the new Arboretum Shelter. At the shelter visitors find a display of pamphlets and a guide for touring the Arboretum. Wall plaques display the names of donors to the Arboretum. The shelter was donated by the estate of Mrs. Kate McKay.
1982	A bronze plaque recognizing the work of the Arboretum Planning Committee was dedicated at the Hales-McKay Memorial Shelter.
Fall 1984	Additional refrigeration equipment was installed in the storage area of the Arboretum Service Centre, giving needed flexibility in timing nursery operations.
May 1985	The first Woody Plants Inventory for Collection Trees and Shrubs was published. Updating of the list was facilitated by the conversion of the record system to a computer based system.
June 1985	The Rose Garden Trust Fund was established, made possible by a generous estate grant. The fund will be used to support the ongoing maintenance of the Frances Ball Rose Collection.
June 1985	The drift-wood and metal sculpture, "Happy Cloud", by Sofu Teshigahara was unveiled. The sculpture is now on permanent loan to the Univeristy of Guelph sculpture collection from the Ontario Heritage Foundation.
Fall 1985	Arboretum Road was paved. Arboretum Master Plan update intiated.

APPENDIX B

User Surveys

arboretum master plan review committee
PROPOSED GOALS and OBJECTIVES

Aim

The University of Guelph Arboretum is a multiple use facility dedicated to research, educational and recreational activities for the University, the international scientific community and the general public.

The following Goals and Objectives have been established to accomplish the stated Aim of the Arboretum:

University of Guelph

1. Goal

To serve as a RESEARCH facility for the University, industry and the greater scientific community related to taxonomy, species improvement and environmental conservation of woody plants.

Objectives

(a) Establish and maintain a major botanical collection of native and exotic woody plants.

(b) Provide resource materials and a detailed computerized inventory of the collections.

(c) Retain a support staff that can assist in the liaison and conduct of on-site research activities.

(d) Establish and maintain a gene bank of native, rare and other woody material for conservation, research, exchange and plant development purposes.

(e) Retain an acquisition policy and programme that will serve the research and educational goals of the facility.

(f) Conserve significant on-site natural areas that may serve as an outdoor laboratory for biological research.

(g) Promote the availability of resources to the research community.

(h) Participate in international plant conservation and seed exchange programmes.

2. Goal

To serve as an Academic Unit[1] for the University and as an EDUCATIONAL facility for the general public and related industry.

Objectives

(a) Provide a major, representative collection of identified woody plants in an appropriate setting.

(b) Maintain a resource room and herbarium for reference purposes.

(c) Retain academic[2] resource staff to liaison with University educational units.

(d) Develop demonstration areas that illustrate plant material application in an appropriate setting.

(e) Provide nature interpretation facilities and educational programmes for the community (pre-schoolers to senior citizens including the physically and mentally handicapped).

(f) Maintain consultation and/or referral service for the general public.[3]

3. Goal

To provide an AMENITY for the University, the City of Guelph, appropriate special interest groups and the broader general public.

Objectives

(a) Maintain a high standard of aesthetic quality in the development of plant collections and support facilities.

(b) Provide cultural programmes that are consistent with the Goals and the general character of the Arboretum.

(c) Accommodate passive recreation uses that are compatible with the Arboretum facilities.

(d) Incorporate horticultural displays, sculpture and other art forms that are complementary to the Arboretum Master Plan.

(e) Provide a facility for meetings and public gatherings that are related to the Aim of the Arboretum.

(f) Create a facility of general significance and interest for visitors to the Guelph area.

1 It may be desirable to change the status from that of a support facility to that of an academic unit to optimize the educational potential of the Arboretum.

2 Requires a change in status of the facility and implies a greater teaching and research responsibility.

3 Requires additional staff and financial support.

UNIVERSITY OF GUELPH
COLLEGE OF BIOLOGICAL SCIENCE
Department of Botany

GUELPH, ONTARIO, CANADA N1G 2W1
Telephone (519) 824-4120

Rerum
Cognoscere
Causas

September 26, 1985

To: Dean C.L. Gyles,
Faculty of Graduate Studies

From: Arboretum Master Plan Committee*

Subject: Use of Arboretum facilities and resources

A University committee is presently reviewing the status and existing resources of the Arboretum with the intent of updating the Master Plan to replace the original of 1970. Part of this review is concerned with the present and future academic needs for the Arboretum for research, education and amenity uses.

We would appreciate your response to the following questions:

1. Which departments of your college and which faculty of each department presently use or anticipate using Arboretum facilities and resources.

2. If the Arboretum is presently used by faculty of your college, how is it used?

3. What is your perception of the need for an Arboretum at the University of Guelph?

We have enclosed a draft of "Goals and Objectives": of the Arboretum for your information. It is the intention of the Committee to meet with department chairmen and faculty to review Arboretum user needs and other issues in the immediate future.

*Master Plan Update Committee:
J. Taylor, Landscape Architecture
E. Jorgensen, Arboretum
D. Smith, Botany

teaching and research in the arboretum
A QUESTIONNAIRE

A University Committee is presently reviewing the status and existing resources of the Arboretum with the intent of updating the Arboretum Master Plan to replace the original of 1970. Part of the review is concerned with the present and future academic use of the Arboretum for education, research and amenity.

The Committee would appreciate your comments and suggestions, especially as they relate to the following questions:

1 Do the draft "Goals and Objectives" of the Arboretum (see attached) define an appropriate role for the facility in the University and community?

2 Do you regularly visit the Arboretum and, if so, what is the purpose of your visits?

3 How can the Arboretum staff and facilities support your needs in research and education?

4 Do you presently, or in the future, expect to need facilities or resources which should be provided by the Arboretum?

comments

PLEASE CHECK

☐ FACULTY

☐ STAFF

signature optional

PLEASE FORWARD TO: ARBORETUM MASTER PLAN COMMITTEE
UNIVERSITY OF GUELPH ARBORETUM

THE UNIVERSITY OF GUELPH ARBORETUM
INVITES YOU TO GIVE
YOUR OPINION

A University committee reviewing the status and resources of the Arboretum is concerned with its uses by the University community for education, research and recreation. An abbreviated version of the proposed Aim and Goals of the Arboretum are as follows:

Aim

The University of Guelph Arboretum is a multiple use facility dedicated to research, educational and recreational activities for the University, the international scientific community and the general public.

The following Goals have been established to accomplish the stated aim of the Arboretum:

Goal

To serve as a Research facility for the University, industry and the greater scientific community related to taxonomy, species improvement and environmental conservation of woody plants.

Goal

To serve as an Academic Unit for the University and as an Educational facility for the general public and related industry.

Goal

To provide an Amenity for the University, the City of Guelph, appropriate special interest groups and the broader general public.

QUESTIONNAIRE

• We are soliciting student's answers to the following questions. Please answer yes or no and provide comments in the block provided (or on a separate page if more space is required). Please drop the completed questionnaire in the campus mail box at the U.C. Information Desk or forward directly to the University of Guelph Arboretum

• Have you used the Arboretum...

	Yes	No
On a regular basis?	☐	☐
In course work?	☐	☐
In employment?	☐	☐
In conducting research?	☐	☐
For recreation?	☐	☐

• Do you feel the Arboretum is a valuable University facility? ☐ ☐

• Please add your commments related to the stated goals and other issues.

_____

_____

_____

_____

_____

PLEASE FORWARD TO:
ARBORETUM MASTER PLAN REVIEW COMMITTEE
UNIVERSITY OF GUELPH ARBORETUM

UNIVERSITY OF GUELPH
ONTARIO AGRICULTURAL COLLEGE
University of Guelph Arboretum

GUELPH, ONTARIO, CANADA N1G 2W1
Telephone (519) 824-4120

Rerum
Cognoscere
Causas

November 11, 1985

COMMUNITY SURVEY

Dear Sir or Madam:

A University Committee is presently reviewing the status and existing resources of the University of Guelph Arboretum. Part of the review is concerned with the present and future use of the facility by the community at large.

We are writing to solicit your comments regarding the proposed "Goals and Objectives" of the Arboretum (attached). Comments about any further concerns that you may have about your use of the facility would be welcomed.

Sincerely yours,

Dr. David W. Smith
ARBORETUM MASTER PLAN COMMITTEE
UNIVERSITY OF GUELPH ARBORETUM

DWS/cb
Encl.

APPENDIX C

A report on Surficial Materials and Conditions of the Arboretum.

A REPORT ON

SURFICIAL MATERIALS AND CONDITIONS

OF THE

ARBORETUM

UNIVERSITY OF GUELPH

Submitted to

Arboretum Planning Committee
by
J. Dougan Associates
Box 1203, Guelph, Ontario

January, 1986

INTRODUCTION

This study was authorized by Prof. J. Taylor, Chairman of the University of Guelph Arboretum Planning Committee. The purpose of this study was to review existing biophysical documentation concerning the Arboretum lands, and to update the information contained in the original 1970 Arboretum Master Plan which was prepared by W.E. Coates.

Fieldwork for this study, which included a survey of surface texture, drainage, hydrology and moisture regime, was undertaken in November, 1985. Findings are presented on the Surficial Materials and Conditions map which accompanies this report. The balance of the report presents updated information on physiography and soils of the Arboretum, and analysis of field survey observations.

.YSIOGRAPHY

The bedrock underlying much of Wellington County and the Arboretum itself consists of a dolostone known as the Guelph Formation. This is one of a series of thick limestones which developed following the accumulation of marine sediments during the Devonian and Silurian ages. Within the Arboretum, this bedrock is covered by 20 to 25 metres of drift material deposited during the last glaciation. However, outcrops of the Guelph Formation and associated limestones are visible along the valley of the Eramosa River.

The Arboretum is located on the southeastern extremity of the physiographic region known as the Guelph Drumlin Field. This particular region contains approximately 300 of the oval-shaped hills known as drumlins, consisting of till deposited by the Lake Ontario Ice Lobe of the Wisconsinan Glacier. The Arboretum itself contains remnants of two major drumlins, oriented to the southeast which was the direction of origin of the glacier. The surficial materials consist of a medium-textured stony till characteristic of drumlins. The low areas between drumlins consist of gravel terraces which formed the spillways from the melting glacier; today they are frequently swampy.

ÍLS

General Characteristics

The soils in this section of the Guelph Drumlin Field are dominated by the Guelph till catena, which is generally comprised of grain sizes as follows: sand - 50%; silt - 35%; clay - 15%. These proportions vary considerably due to post-glacial silting and erosion. These soils originated from the glacial pulverization of the grey and brown limestones which underly this region, resulting in somewhat calcareous conditions at depth.

The soils are predominantly loams and sandy loams characterized by a dark grayish-brown surface horizon over brown and yellowish-brown subsurface horizons. Undisturbed surface horizons are stone-free to slightly stony, with moderate stoniness encountered at depths of 40 cm or greater. The Guelph till catena includes Guelph Loam (well-drained), London Loam (imperfectly-drained) and Parkhill Loam (Poorly-drained). Other catenas with minor representation include Brant, Brantford, Burford, Caledon, Fox, Honeywood, St. Jacobs and Woolwich.

Although the surface texture of the Arboretum soils ranges from silty loam to coarse gravelly loam till, most areas are occupied by sandy loam over gravel. The extensive wet areas in and around Wild Goose Woods and the Southwoods contain poorly-drained loams and organic muck.

Field Survey

A field survey of the Arboretum soils was undertaken as part of the biophysical updating for the Master Plan. The objective was to map surface texture, topsoil depth, internal drainage, and moisture regime. Field sampling included corings at 30 m intervals along transects spaced 120 m apart. Shallow soil pits up to 1 m in depth were machine-dug in representative locations. Inclement weather placed restrictions on the pit investigations of imperfectly- and poorly-drained soils.

Field studies were supplemented by discussions with Arboretum personnel, who provided useful information on existing soil conditions and land use history.

Study findings are recorded on the Surficial Materials and Conditions map. For discussion purposes, the site has been divided into three zones as follows: Zone A - north of College Ave.; Zone B - central area between Stone Rd. and College Ave., and; Zone C - south of Stone Rd.

Description/Concerns/Recommendations

For summary purposes, observations and concerns are presented below in tabular form for each of the three zones. Refer to Surficial Materials and Conditions map for unit locations.

Zone A - area north of College Avenue

Units A-1 to A-4

Description: Predominantly well-drained loams (sandy loam, gravelly sandy loam) and loam till; A-2 and much of A-3 very stony with shallow topsoil, rapid internal drainage. Stoniness variable over short distances.

Concerns: Past erosion along northern boundary predominantly controlled with plantation cover; very stony surface materials; slopes over 5% subject to sheet erosion and rill development if cultivated.

Recommendations: 1. Maintain and upgrade groundcovers in erosion prone sections.
2. Use plant materials suited to periodic drought.

Units A-5 to A-7

Description: Imperfectly and poorly drained area of fine-textured loam; topsoil of moderate depth, stonefree to moderately stony; permeability of underlying till prevents permanent inundation.

Concerns: None

Recommendations: 1. Drainage in A-7 can be improved with tiling.
2. Use plant materials adapted to seasonal flooding.

Units A-8 and A-9

Description: Imperfectly and poorly drained areas of eroded silts and sandy loam along stream channel; reedgrass cover.

Concerns: Subject to periodic scouring during heavy runoff; frequent waterlogging; not suited for pond development.

Recommendations: 1. Establish suitable woody cover along stream banks.
2. Inspect on seasonal basis; protect new erosion points with plantings, rip-rap.

Unit A-10

Description: Well-drained sandy loam; deep topsoil with moderate stoniness in upper section, stony conditions with higher sand content towards base of slope.

Concerns: Sheet erosion across north-facing slope.

Recommendations: 1. Maintain green strips at regular intervals across face of slope.
2. Apply regular organic amendments and green crops.

Zone A - (continued)

Units 11 and 12

Description: Well-drained loam ; topsoil of moderate or better depth, locally stony but predominantly stonefree; past topsoil stripping at western end.

Concerns: Erosion prone areas, past slumping along easterly and northerly slopes.

Recommendations: 1. Maintain and upgrade groundcovers in erosion prone areas.

Other Areas - Deep fill (1-4 m) over buried streamcourse; spoil from pond excavation with minimal topsoil cover.

Zone B - central area between College Avenue and Stone Road

Units B-1 and B-2

Description: Well-drained sandy loam; undisturbed topsoil deep, relatively stonefree; silting from adjacent slopes.

Concerns: Past filling and gravel extraction.

Recommendations: None

Units B-3 to B-5

Description: Imperfectly and poorly drained fine-textured loams; topsoil stonefree, of moderate depth.

Concerns: Spring runoff impeded by lack of culvert outlet under College Ave.; surcharging from Correctional Services lands east of Victoria Rd.; Shallow rooting of trees evident.

Recommendations: 1. Provide outlet for seasonal runoff in Victoria Woods.
2. Explore alternative drainage schemes for Correctional Services lands.

Units B-6 to B-9

Description: Well-drained sandy loam; topsoil shallow to moderately deep, moderately stony to stony; underlying gravel at shallow depth. Imperfect drainage in B-9.

Concerns: Slopes over 5% subject to sheet erosion.

Recommendations: 1. Maintain and upgrade groundcovers in erosion prone sections.

Units B-10 and B-11

Description: Drumlin with well-drained gravelly loam till at northwest end, finer textured loam to southeast; topsoil shallow in exposed locations but overall of moderate depth.

Zone B - (continued)

Concerns: Past sheet erosion and slumping of slopes over 5%; rapid internal drainage of coarse-textured materials.

Recommendations: 1. Maintain and upgrade groundcovers in erosion prone sections.
2. Use plant materials suited to periodic drought.

Unit B-12

Description: Imperfectly drained fine-textured loam; topsoil shallow to moderate in depth, moderately stony with stony pockets; past topsoil stripping and filling.

Concerns: Imperfect drainage caused by underlying impermeable layers of silt and clay; pockets of highly disturbed soils created by past stripping and filling; topsoil subject to seasonal waterlogging and gravitational creep.

Recommendations: 1. Employ contour ploughing, frequent green strips to reduce erosion in cultivated areas.
2. Restrict major operations to dry periods.
3. Improve internal drainage and runoff with tiling, french drains, swales.

Units B-13, B-16 to B-18

Description: Imperfectly and poorly drained loam surrounding Wild Goose Woods; topsoil stonefree, of moderate depth; drainage improvements (ditches) in vicinity of hybrid poplar plantations.

Concerns: Imperfect and poor drainage due to shallow water table, minimal grades; improvements to surface runoff feasible.

Recommendations: 1. Improve surface drainage using swales, french drains.
2. Use plant materials suited to seasonal flooding.

Units B-14 and B-15

Description: Imperfectly drained loam; B-14 serviced by tile drain network; topsoil stonefree, shallow to moderate depth.

Concerns: Tile system in B-14 not fully operative, resulting in wet pockets and periodic ponding.

Recommendations: 1. Improve drainage by upgrading tile system.
2. Use plant materials tolerant of occasional flooding.

Unit B-19 - see A-12

Other Areas - Physical Resources Yard and Apiculture Centre - extensive filling and soil disturbance.

Victoria Pond spoil piles - minimal topsoil cover

Wild Goose Pond spoil piles - minimal topsoil cover

Streamcourse - poorly-drained channel deposits - see A-8&9

Zone C - area south of Stone Road

Unit C-1

Description: Well-drained fine sandy loam; topsoil stonefree, of moderate depth.

Concerns: Erosion potential on slopes over 5%

Recommendations: 1. Maintain groundcovers in erosion prone sections.

Units C-2 and C-3

Description: Imperfectly drained sandy loam; topsoil stonefree to moderately stony, shallow to moderate depth; seepage from adjacent slopes and seasonal high water table.

Concerns: Drainage improvements not feasible due to location.

Recommendations: 1. Use plant materials tolerant of seasonal flooding.

Units C-4 to C-8

Description: Poorly drained loam and organic muck; loam stonefree and moderately deep; single culvert drains this area.

Concerns: Impoundment of surface flow by Stone Rd.; insufficient grades to improve drainage significantly.

Recommendations: 1. Use plant materials suited to swamp conditions.
2. Provide minimal drainage improvements in planted areas with ditches; additional culverts across Stone Rd.

Unit C-9

Description: Imperfectly-drained loam; topsoil stonefree, shallow to moderate depth.

Concerns: Seasonally-high water table; grades do not permit much opportunity for improvement.

Recommendations: 1. Use plant materials tolerant of seasonal flooding.
2. Provide local drainage improvements around plantings with swales, french drains.

Unit C-10

Description: Well-drained loam over gravel terrace; topsoil stonefree and of moderate depth; rapid internal drainage; abrupt terrace slopes.

Concerns: Subject to seasonal drought; slopes with erosion potential.

Recommendations: 1. Maintain groundcovers in erosion prone sections.
2. Irrigate during dry periods.

Other Areas - Former gravel pit at Stone and Victoria Rds. - filled with imperfectly drained loam till, perched water table due to high clay and silt content; no topsoil present.

SURFACE DRAINAGE

The major surface drainage feature in the Arboretum is the streamcourse which originates in the Southwoods Swamp. This stream, which drops 12 metres between Stone Road and the northern perimeter of the Arboretum, serves a watershed area of approximately 275 hectares. The streamflow is intermittent, with flow in evidence from October to late June.

The stream channel is poorly defined south of College Lane, consisting of ponded areas linked by a shallow channel. Between College Lane and College Ave., the channel is well-defined, ranging from 1 to 2.5 metres in depth. The banks in this section are stable and well vegetated; the streambed is characterized by a main channel 1-2 metres wide, faced with 0.5 metre depths of sandy loam and silt deposits. These deposits support a dense growth of reed grasses. There are indications throughout this section of past filling and streambank manipulation.

North of College Avenue, the stream is buried in a culvert over a distance of 220 metres. The natural features of the valley are obscured by fill ranging in depth from 1 to 4 metres. A culvert originating from the tile drain system in Zone B intercepts the stream culvert in this area. At the lower end of the stream culvert, there is a small impoundment. The balance of the channel is similar in most respects to that lying south of College Avenue; a narrow main channel contained within shallow deposits of eroded materials, stabilized by reed grasses. The stream crosses a major till deposit in this section, forming a deeply-incised valley with 15 metre walls.

The permeability of underlying parent materials, and proximity to the Eramosa River valley preclude the establishment of any permanent ponds along this creek, except perhaps south of College Lane. A detailed flow monitoring study should be a prerequisite to a decision to develop such a feature.

A minor surface drainage system which operates on a seasonal basis is located along Victoria Road at College Avenue. Local spring runoff and groundwater seepage from the main drumlin flow into the lowlying area running from the centre of Victoria Woods north to College Avenue. Under normal circumstances, this would produce seasonal ponding adjacent to College Avenue. However, additional surcharging takes place from the lands owned by the Ministry of Correctional Services east of Victoria Road, through a culvert located near the south end of Victoria Woods. The result is an extensive area of flooding extending from Victoria Pond to north of the Willow Pond. Gradual drainage takes place through the permeable parent materials; there is no surface outlet at present. Drainage options include a deep culvert along Victoria Road to the Eramosa River, diversion of Correctional Services runoff to another location, or establishment of a channel/culvert combination to connect with the stream located to the west.

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APPENDIX D

Wildlife Species Found in the University of Guelph Arboretum.

Wildlife Species Found in the University of Guelph Arboretum

AMPHIBIANS AND REPTILES	Habitat
Snapping Turtle	A
Eastern Painted Turtle	A
Northern Brown Snake	all areas
Red-bellied Snake	all areas
Eastern Garter Snake	all areas
Ring Necked Snake	all areas
Smooth Green Snake	all areas
Milksnake	all areas
Blue spotted Salamander	A, W
Red-spotted Newt	A, W
Red-backed Salamander	A, W
American Toad	all areas
Spring Peeper	A, W
Grey-backed Tree Frog	A, W
Western Chorus Frog	A
Green Frog	A
Wood Frog	A, W
Leopard Frog	A, F

BIRDS	
Great Blue Heron (Summer)	A-1, W-2,3, F-2
Green Heron (Summer, nesting)	W-1, F-1,2
Cattle Egret	
American Bittern (Summer, nesting)	W-2
Canada Goose W (Summer, nesting)	W-1,2, F-1,2
Mallard W (Summer, nesting)	W-2,3, F-3
Blue-winged Teal (Summer, nesting)	W-3,F-1
Wood Duck (Summer)	W-3,F-1
Bufflehead (Spring)	all areas
Common Merganser (Spring)	"
Turkey Vulture (Spring)	"
Sharp-shinned Hawk (Summer)	W-1
Cooper's Hawk	

Red-tailed Hawk (Summer)	W-1, F-1,2
Red-shouldered Hawk (Spring, Summer)	W-2, all areas
Broad-winged Hawk (Summer)	F-1
Rough-legged Hawk (Winter)	W-2
Marsh Hawk	
Osprey	
American Kestrel (Winter, Summer, nesting)	W-2,3, F-1,2,3
Ruffed Grouse (Winter, Summer)	W-1,2
Bobwhite (nesting)	
Virginia Rail (Summer, nesting)	F-1
Sora Rail (Summer, nesting)	F-1
Killdeer (Summer, nesting)	W-1,2,3, F-1,2,3
American Woodcock (nesting)	
Common Snipe (nesting)	
Spotted Sandpiper	
Solitary Sandpiper (Spring)	all areas
Herring Gull (Winter)	all areas
Ring-billed Gull (Winter, Summer)	W-2,3, F-1,2
Bonaparte's Gull (Spring)	all areas
Rock Dove (Winter, Summer)	W-1,2,3, F-1,2,3
Mourning Dove (Summer, nesting)	W-1,2, F-1,2
Yellow-billed Cuckoo	
Black-billed Cuckoo (Summer, nesting)	W-2
Screech Owl (nesting)	
Great Horned Owl (Winter, Summer)	W-1
Snowy Owl (Winter)	
Barred Owl (Summer)	W-1
Saw-whet Owl	
Common Nighthawk	
Chimney Swift (Summer)	W-1,2, F-2
Ruby-throated Hummingbird (Summer, nesting)	W-2, F-2
Belted Kingfisher (Summer, nesting)	W-2,3
Common Flicker (Summer, nesting)	W-1,2,3, F-1,2
Pileated Woodpecker (Winter nesting)	
Red-headed Woodpecker (Summer, nesting)	W-3
Yellow-bellied Sapsucker	
Hairy Woodpecker (Summer, nesting)	W-2,3

Downy Woodpecker (Winter, Summer, nesting)	W-1,2,3
Eastern Kingbird (Summer)	W-1,2,3, F-1,2, A-1
Great Crested Flycatcher (Summer, nesting)	W-1,2,3, F-1,2
Eastern Phoebe	
Yellow-bellied Flycatcher	
Alder Flycatcher	
Willow Flycatcher	
Least Flycatcher (Summer)	F-1
Eastern Wood Peewee (Summer, nesting)	W-1,2,3, F-1
Horned Lark (Summer, nesting)	F-1
Tree Swallow (Summer, nesting)	W-2,3, F-1,2,3, A-1
Barn Swallow (Summer, nesting)	W-2,3, F-2
Blue Jay (Winter, Summer, nesting)	W-1,2,3, F-1,2
Common Crow (Winter, Summer, nesting)	W-1,2,3, F-1,2,3
Black-capped Chickadee (Winter, Summer, nesting)	W-1,2,3, F-1
White-breasted Nuthatch (Winter, Summer, nesting)	W-1,2
Red-breasted Nuthatch (Winter	
Brown Creeper (Winter, nesting)	
House Wren (Summer, nesting)	W-2,3, F-1
Winter Wren	
Mockingbird (nesting)	
Gray Catbird (Summer, nesting)	W-2, F-1,2
Brown Thrasher (Summer, nesting)	F-1,2
American Robin (Winter, Summer, nesting)	W-1,2,3, F-1,2, A-1
Wood Thrush	
Hermit Thrush	
Swainson's Thrush	
Grey-cheeked Thrush	
Veery (Summer, nesting)	W-2, F-1
Eastern Bluebird	
Blue-grey Gnatcatcher	
Golden-crowned Kinglet (Winter)	
Ruby-crowned Kinglet	
Cedar Waxwing (Winter, Summer, nesting)	W-1,2,3, F-1,2,3
Northern Shrike (Winter)	
Starling (Winter, Summer, nesting)	W-1,2,3, F-1,2,3
Yellow-throated Vireo	

Solitary Vireo Red-eyed Vireo (Summer, nesting)	W-1,2,3
Philadelphia Vireo (Spring)	all areas
Warbling Vireo (Spring, Summer, nesting)	W-2 ,F-1, all areas
Black-and-white Warbler (Spring, nesting)	all areas
Golden-winged Warbler	
Tennessee Warbler (Spring)	all areas
Nashville Warbler (Spring)	all areas
N. Parula Warbler	
Yellow Warbler (Spring Summer, nesting)	W-1,2, F-1,3, all area
Magnolia Warbler (Spring)	all areas
Cape May Warbler	
Black-throated Blue Warbler (Spring)	all areas
Yellow-rumped Warbler (Spring)	all areas
Black-throated Green Warbler (Spring)	all areas
Blackburnian Warbler (Spring, Summer)	W-2, all areas
Chestnut-sided Warbler (Spring)	all areas
Bay-breasted Warbler (Spring)	all areas
Blackpoll Warbler	
Pine Warbler	
Palm Warbler	
Ovenbird (Spring)	all areas
Northern Waterthrush (Spring, Summer, nesting)	W-1,2, F-1, all areas
Common Yellowthroat (Spring, Summer, nesting)	W-2 ,F-1, all areas
Wilson's Warbler	
Canada Warbler (Spring)	all areas
American Redstart (Spring)	all areas
House Sparrow (Winter, Summer, nesting)	W-1,3
Bobolink (Summer, nesting)	W-2,3, F-1,2,3
Eastern Meadowlark (Summer, nesting)	W-1,2,3, F-1,2,3
Red-winged Blackbird (Summer, nesting)	W-1,2,3, F-1,2,3
Northern Oriole (Summer, nesting)	W-1,2,3, F-1
Rusty Blackbird	
Common Grackle (Summer, nesting)	W-1,2,3, F-1,2,3
Brown-headed Cowbird (Summer, nesting)	W-1,2,3, F-1,2,3
Scarlet Tanager (Spring, Summer)	W-2, all areas
Cardinal (Winter, Summer, nesting)	W-1,2,3, F-1,2

Rose-breasted Grosbeak (Summer, nesting)	W-2,3, F-1,2
Indigo Bunting (Summer, nesting)	W-1,2,3, F-1
Evening Grosbeak (Winter)	
Purple Finch (Winter, Summer, nesting)	W-3
Pine Grosbeak (Winter)	
Common Redpole	
Pine Siskin (Winter)	
American Goldfinch (Winter, Summer, nesting)	W-1,2,3, F-1,2,3
White-winged Crossbill	
Rufous-sided Towhee (nesting)	
Savannah Sparrow (Summer, nesting)	W-2,3, F-1,2,3
Grasshopper Sparrow (Summer, nesting)	F-1,
Vesper Sparrow (nesting)	
Dark-eyed Junco (Winter)	
Tree Sparrow (Winter)	
Chipping Sparrow (Summer, nesting)	W-1,2,3, F-1,2
Field Sparrow (Summer, nesting)	W-1,2
White-crowned Sparrow (Spring)	all areas
White-throated Sparrow	
Fox Sparrow	
Lincoln's Sparrow	
Swamp Sparrow (nesting)	
Song Sparrow (Summer, nesting)	W-1,2,3, F-1,2
Snow Bunting	

MAMMALS

Masked Shrew	W-2
Hairy-tail Shrew	W-1,2,3
Short-tail Shrew	W-1,2,3
Star-nosed mole	W-3
Little Brown Bat	all areas
Raccoon	W-1,2
Least Weasel	W-1,3
Long-tailed Weasel	W-3
Striped Skunk	W-1,2
Red Fox	W-1, all areas

APPENDIX E

Collection Descriptions

COLLECTION: SYNOPTIC **NO. 1**

a) CLASSIFICATION: botanic/demonstration

b) STATEMENT OF PURPOSE:
- to be used as an outdoor classroom for University courses dealing with woody plants
- to be used as the key collection for understanding the relationships and diversity among woody plants
- to act as an introduction to the nature and structure of the University of Guelph Arboretum and arboreta in general.

c) CONTENT:
- a sampling of one or a few species of each genus to represent morphological and geographic diversity
- all significant genera to be represented as well as some small families not represented elsewhere in the Arboretum
- composition - 40% trees
  - 60% shrubs.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- diverse habitats and conditions.

f) DESIGN GUIDELINES:
- park-like setting with topographic and spatial features designed to encourage exploration and discovery
- user amenities such as footpaths, benches, and signage to be provided
- plants to be grouped by family but deviation in the form of underplanting and interplanting for visual effect and/or habitat establishment to be permitted.

COLLECTION: ACERACEAE **NO. 2**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- 66 species and 20 cultivars of the genus Acer represented by approximately 150 individual plants
- trees will predominate strongly over shrubs.

d) MANAGEMENT LEVEL: - medium

e) CULTURAL REQUIREMENTS:
- generally variable with screened and shaded areas for understory species.

f) DESIGN GUIDELINES:
- existing screening and canopy development to be augmented
- collection area to be increased by ±25% over present size
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens.

COLLECTION: BETULACEAE **NO. 3**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Betula - 50 species
- Alnus - 15 species
- Carpinus - 8 species
- Corylus - 8 species
- Ostrya - 3 species
- Cultivars - 15-20
- represented by approximately 190 individual plants
- trees will predominate slightly over shrubs.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- soils to be moist to medium
- shade required for Carpinus
- 1/2 shade required for Corylus and Ostrya.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens
- planting plan to exploit winter appearance of birch through the creation of a setting which displays their distinctive bark.

COLLECTION: ERICACEAE **NO. 4**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely
- emphasis on species hardy in the Guelph region
- high horticultural interest.

c) CONTENT:
- Rhododendron - 70 species and 30 cultivars
- other genera - ± 15 comprising ± 30 species
- 230 individual plants
- shrubs and small trees, shrubs will predominate.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- peat soil
- wind shelter
- partial shade.

f) DESIGN GUIDELINES:
- setting to be evocative of the woodland situation in which these plants are usually found
- existing site requires additional screening and canopy development
- thining and removal of older trees and undesirable shrubs is required.

COLLECTION: FAGACEAE **NO. 5**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Quercus - 40 species
- Fagus - 8 species
- Castanea - 5 species
- cultivars - 20
- 120-130 individual plants
- large trees predominate.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- deep soils
- canopy and shelter for Fagus and Castanea establishment.

f) DESIGN GUIDELINES:
- particular attention to be paid to development of protective screen and canopy; consider use of existing forestry plantations on northern edge of Arboretum
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens.

COLLECTION: JUGLANDACEAE **NO. 6**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Juglane, Carya, Platycarya and Pterocarya - 20 species
- 35 individual plants
- all to be large trees.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- deep soil
- moist and dry sites required.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens
- planting plan should strive for an open woodland effect.

COLLECTION: LEGUMINOSAE **NO. 7**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Robinia - 9 species and 10 clones of Robinia pseudoacacia
- Gleditsia, Gymnocladus, Sophora, Cercis, and Cladrastis - 25 species
- 70 individual plants
- medium to large trees predominate.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- moist soil conditions
- shelter for tender species.

f) DESIGN GUIDELINES:
- collection to be designed around selected best clones of existing Robinia collection
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens.

COLLECTION: OLEACEAE **NO. 8**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Fraxinus - 18 species
- 36 individual plants
- medium to large trees predominate.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- no specific requirements
- adaptable to dry slopes.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens.

COLLECTION: ROSACEAE **NO. 9**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Prunus, Sorbus, Amelanchier, Malus, Pyrus, Crataegus, Potentilla, Spiraea, Physocarpus, Aronia, Cotoneaster, Rubus and other genera
- comprising 240 species and 75 cultivars
- approximately 550 shrubs and small to medium size trees
- shrubs and small trees predominate.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- sunny location
- dry to moist soils.

f) DESIGN GUIDELINES:
- consideration to be given to high level of public appeal and the need for interpretive information
- enlargement of existing site to relieve congestion in Prunus and Sorbus sections.

COLLECTION: ROSA **NO. 10**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- to exhibit a full representation of species diversity and various cultivar classes including old garden roses and recent hardy cultivars developed in Canada and the northern United States
- horticultural emphasis.

c) CONTENT:
- Rosa - 200 species and cultivars

d) MANAGEMENT LEVEL: intensive

e) CULTURAL REQUIREMENTS:
- sunny location with good air drainage and moist heavy soils.

f) DESIGN GUIDELINES:
- to be integral with No. 9 Rosaceae
- consideration to be given to high level of public appeal, visual prominence and display value
- consolidation of some beds into continuous areas and the creation of larger open spaces than is the existing condition, is advised
- inclusion of green plants for background and spatial enclosure and inclusion of tree canopy (located so as not to shade collection materials) is advised.

COLLECTION: SALICACEAE **NO. 11**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Salix - 65 species
- Populus - 23 species
- Chosenia - 1 species
- 180 individual plants
- some shrubs, but medium to large trees predominate.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- wet meadow to dry slopes.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens
- depth of existing pond to be reduced, or pond to be filled.

COLLECTION: TILIACEAE **NO. 12**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Tilia - 19 species
- 38 individual plants
- medium to large trees predominate.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- good soil drainage

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens
- existing collection materials are not appropriate and may be eliminated allowing flexibility for design.

COLLECTION: ULMACEAE **NO. 13**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Ulmus, Zelkova and Celtis - 28 species
- 50 individual plants
- medium to large trees predominate
- some (10%) large shrubs.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- most will tolerate dry soils
- provide some protection for tender species.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens.

COLLECTION: CONIFEROUS TREES **NO. 14**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely.

c) CONTENT:
- Pinaceae, Cupressaceae, Taxodiaceae and Taxaceae (major coniferous families) - 90 species - 40 cultivars
- 220 individual plants
- medium to large trees predominate.

d) MANAGEMENT LEVEL: medium

e) CULTURAL REQUIREMENTS:
- good soil drainage
- some sheltered areas required for Cedrus, Cryptomeria, Tsuga and some Pinus.

f) DESIGN GUIDELINES:
- planting design to be informal and permit comparison of individuals within and between species
- attention to be paid to the creation of spaces from which to view individual specimens

- existing configuration is appropriate
- infill planting and adjustments to be made as stock is available.

COLLECTION: DWARF CONIFERS **NO. 15**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of a range of morphological variations in low growing species, and dwarf forms of tree species as expressed in various cultivar selections
- collection is of horticultural interest.

c) CONTENT:
- dwarf and/or prostrate varieties of Pinaceae, Cupressaceae and Taxaceae
- 170 cultivars and species.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- good soil drainage
- wind screening and partial shade required in some cases.

f) DESIGN GUIDELINES:
- consideration of high level of public interest by designing for ease of access, orientation and comprehension
- most design effort to consist of minor adjustments to existing configuration and plantings in response to plant growth and the need to include new materials as they become available.

COLLECTION: SHRUBS AND MINOR TREE FAMILIES **NO. 16**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- emphasis on display of species from differing wild sources and provenances not in cultivation, and display of new sources of species in cultivation where improvement appears likely
- collection is of horticultural interest.

c) CONTENT:
- 38 families of trees and shrubs
- comprised of 600 species and 80 cultivars
- approximately 1000 individual plants
- 10% trees - 90% shrubs.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- diverse - encompassing all habitat conditions.

f) DESIGN GUIDELINES:
- collection will have a high level of public interest
- design should strive to develop interesting spatial qualities using a combination of open and planted areas, and tree canopy

and understory in contrasting juxatapositions
- collection to be composed of a series of inwardly focused outdoor rooms
- taxanomic relationships to be expressed at the family level.

COLLECTION: LILACS **NO. 17**

a) CLASSIFICATION: botanic

b) STATEMENT OF PURPOSE:
- collection is of horticultural interest providing a good representation of species diversity
- to have a sampling of cultivars from all major groups but not to be comprehensive.

c) CONTENT:
- Syringa - 25 species - 40 cultivars
- 90 individual plants
- medium to large shrubs predominate.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- good soil drainage and air drainage.

f) DESIGN GUIDELINES:
- visibility and ease of access by public are important factors
- collection should "show" well during the flowering season and recede from visual promenence during the remainder of the year
- consideration should be made of precise blooming period and colour when locating individual plants in order to achieve a balanced visual effect.

COLLECTION: FORMAL HEDGES **NO. 18**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to demonstrate the use of various woody plants as clipped hedges, for evaluation of performance, hardiness and appearance.

c) CONTENT:
- common hedge plants and unusual alternatives
- coniferous and deciduous trees and shrubs to be used
- 100 lineal metres of hedge.

d) MANAGEMENT LEVEL: intensive

e) CULTURAL REQUIREMENTS:
- diversity of exposures and orientations
- medium to good horticultural soil conditions.

f) DESIGN GUIDELINES:
- consider high level of public interest
- exploit high potential as an element to define outdoor space
- consider close association with other structured or horticulturally interesting collections: eg. street trees
- potential to design collection as a garden, which might include other elements as an alternative to straight row planting.

COLLECTION: VINES AND CLIMBERS **NO. 19**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to provide a collection of woody climbing plants of both botanical and horticultural interest in a setting which appropriately displays their ornamental merits and landscape uses.

c) CONTENT:
- 50-75 species and cultivars.

d) MANAGEMENT LEVEL: high

e) CULTURAL REQUIREMENTS:
- diversity of exposures
- medium to good horticultural soil conditions.

f) DESIGN GUIDELINES:
- provide for walls and trellises as appropriate to each species displayed
- design should respond to anticipated high level of public interest
- vines ideally should be displayed in an architectural setting where their use does not appear arbitrary
- exploiting the decorative and functional aspects of this group of plants will enhance the sense of appropriateness.

COLLECTION: STREET TREES **NO. 20**

a) CLASSIFICATION: demonstration/framework

b) STATEMENT OF PURPOSE:
- to display native and exotic tree species appropriate for roadside planting.

c) CONTENT:
- 80+ individual trees in the categories:
  large trees
  medium trees
  small flowering trees

d) MANAGEMENT LEVEL: medium

e) CULTURAL REQUIREMENTS:
- medium to good horticultural soil conditions.

f) DESIGN GUIDELINES:
- present configuration is appropriate
- consider potential for use of other smaller scale trees and shrubs to complement the pattern and reinforce the streetscape image
- consider superimposition of all or part of the formal hedge collection on this site
- investigate potential as a passive recreation/picnic area.

COLLECTION: EDIBLE NUT TREES **NO. 21**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to display species and cultivars of nut trees suitable for planting in southern Ontario
- nut trees provide a potential crop in which there is considerable interest, but for which there is very little research and few demonstration plantings in Ontario.

c) CONTENT:
- Juglans - 20 cultivars
- Carya - 15 species and cultivars
- Corylus - 10 species and cultivars (large shrubs)
- Castanea - 7 cultivars

d) MANAGEMENT LEVEL: medium

e) CULTURAL REQUIREMENTS:
- deep moist soil
- air drainage for marginal species.

f) DESIGN GUIDELINES:
- consider appropriateness of orchard style of planting.

COLLECTION: FALL COLOUR **NO. 22**

a) CLASSIFICATION: demonstration/framework

b) STATEMENT OF PURPOSE:
- to display in a concentrated area, woody plants which have showy autumn coloration as a major attribute, so that their horticulutral and landscape design potential may be observed and evaluated.

c) CONTENT:
- native and exotic trees and shrubs of diverse size, habit and coloration
- some coniferous material as a visual foil and for winter interest.

d) MANAGEMENT LEVEL: low

e) CULTURAL REQUIREMENTS:
- diverse soil, exposure and moisture conditions.

f) DESIGN GUIDELINES:
- collection to express and enhance the stream valley form as part of the Arboretum's framework planting
- respond to anticipated high level of public interest by providing a path network
- design should respond to potential for viewing from adjacent hilltop
- consider establishment of wild herbaceous materials noted for fall floral colour display.

COLLECTION: HABITAT DEMONSTRATION **NO. 23**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to demonstrate the use of plants and landscape configurations which are attractive to wildlife and may be replicated in an urban backyard
- the choice and arrangement of plants will be interpreted for visitors, and records of animal species sighted will be kept.

c) CONTENT:
- various coniferous and deciduous woody plant materials of native and exotic origin, which are commercially available.

d) MANAGEMENT LEVEL: medium

e) CULTURAL REQUIREMENTS:
- no special requirements.

f) DESIGN GUIDELINES:
- design to be developed in close consultation with Arboretum wildlife biologist
- design should reflect a variety of typical situations and exhibit plant groupings of a scale and configuration suitable for urban residential landscapes
- disparate examples to be unified with a framework of informal screening and hedges.

COLLECTION: LAND RECLAMATION **NO. 24**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to demonstrate methods of rehabilitating worked-out gravel pits and similar damaged landscapes
- to demonstrate slope retention plantings
- to display and evaluate the relative success of seeding versus direct planting of unrooted cuttings.

c) CONTENT:
- various native and exotic deciduous trees and shrubs known to tolerate dry, infertile growing conditions.

d) MANAGEMENT LEVEL: minimal

e) CULTURAL REQUIREMENTS:
- no special requirements.

f) DESIGN GUIDELINES:
- demonstration is in place
- visitor orientation and interpretation potential to be reinforced
- minor amount of additional planting may be appropriate in some areas.

COLLECTION: TOXIC PLANTS **NO. 25**

- concept not developed
- consultation with O.V.C. required
- may be appropriate as part of demonstration garden area or on campus adjacent to O.V.C. facilities.

COLLECTION: CAROLINIAN PLANT ASSOCIATIONS **NO. 26**

a) CLASSIFICATION: demonstration

b) STATEMENT OF PURPOSE:
- to display typical plant associations and communities exhibiting typical wild characteristics of the Carolinian forest region.

c) CONTENT:
- trees and shrubs native to the northern portion of the Carolinian forest region of Southern Ontario.

d) MANAGEMENT LEVEL: minimal - low
- check invasion of inappropriate species from adjacent woody areas.

e) CULTURAL REQUIREMENTS:
- diverse plant habitat and growing conditions.

f) DESIGN GUIDELINES:
- setting should remain natural in character and should not appear to have been designed
- consideration should be given to providing a pioneer forest of various appropriate species.

COLLECTION: NATIVE TREES AND SHRUBS **NO. 27**

a) CLASSIFICATION: demonstration/framework

b) STATEMENT OF PURPOSE:
- to display native trees and shrubs in a variety of habitat conditions including wetland, upland, oak savanah, and old field.

c) CONTENT:
- multiple representatives of approximately 60 native tree species and 65 native shrub species with associated native herbaceous plants.

d) MANAGEMENT LEVEL: minimal to medium as appropriate.

e) CULTURAL REQUIREMENTS:
- diverse conditions.

f) DESIGN GUIDELINES:
- design to respond to varying site conditions in an ecologically responsive manner
- design to respond to anticipated high level of public interest by facilitating orientation and interpretation in a manner which is sensitive to the collection's natural character.

COLLECTION: WINDBREAKS **NO. 28**

a) CLASSIFICATION: demonstration/framework

b) STATEMENT OF PURPOSE:
- to display, demonstrate, and evaluate various types and configurations of shelter belt plantings
- collection will consist of an interpretation of appropriate sections of the Arboretum's framework plantings.

COLLECTION: INFORMAL HEDGES **NO. 29**

a) CLASSIFICATION: demonstration/framework

b) STATEMENT OF PURPOSE:
- to display and demonstrate the use of native and exotic shrubs species and cultivars which tend to perform well as hedges without the requirement of formal pruning
- collection to consist of an interpretation of appropriate sections of the Arboretum's framework plantings.

APPENDIX F

Arboretum Base Budget

ARBORETUM BASE BUDGET (1985-86)

OPERATIONS			CAPITAL	
1. Personnel			1. Planning & Engineering	
Permanent	247439			
Temporary	53247(1)			
Benefits	31008		TOTAL	0
TOTAL		331694		
			2. Development	
2. Maintenance & Research				
Maint.	30756(1)			
			TOTAL	0
TOTAL		30756		
3. Equipment			CAPITAL TOTAL	0
Servicing	10000			
Replace*	4000			
TOTAL		14000		
4. Miscellaneous				
Telephone	4000			
Office	5500			
Travel	1000			
Other				
TOTAL		10500		
OPERATIONS TOTAL		386950		

ARBORETUM BASE BUDGET TOTAL (1986$) 386950(2)

*Replacement of major equipment not included

(1) Budget item includes MNR grant.
(2) Funding source: University $340450.; MNR grant $46500.

APPENDIX G

Arboretum Five Year Plan

ARBORETUM FIVE YEAR PLAN (1986-87)

OPERATIONS			CAPITAL		
1. Personnel			1. Planning & Engineering		
Permanent	250000			0	
Temporary	55000(1)				
Benefits	32000		TOTAL		0
TOTAL		337000			
			2. Development washroom @ nature centre	8000	
2. Maintenance & Research					
Maint.	34500(1)		TOTAL		8000
TOTAL		34500			
3. Equipment			CAPITAL TOTAL		8000
Servicing	10000				
Replace*	4000				
TOTAL		14000			
4. Miscellaneous					
Telephone	6000				
Office	5500				
Travel	1100				
Other	250				
TOTAL		12850			
OPERATIONS TOTAL		398350			

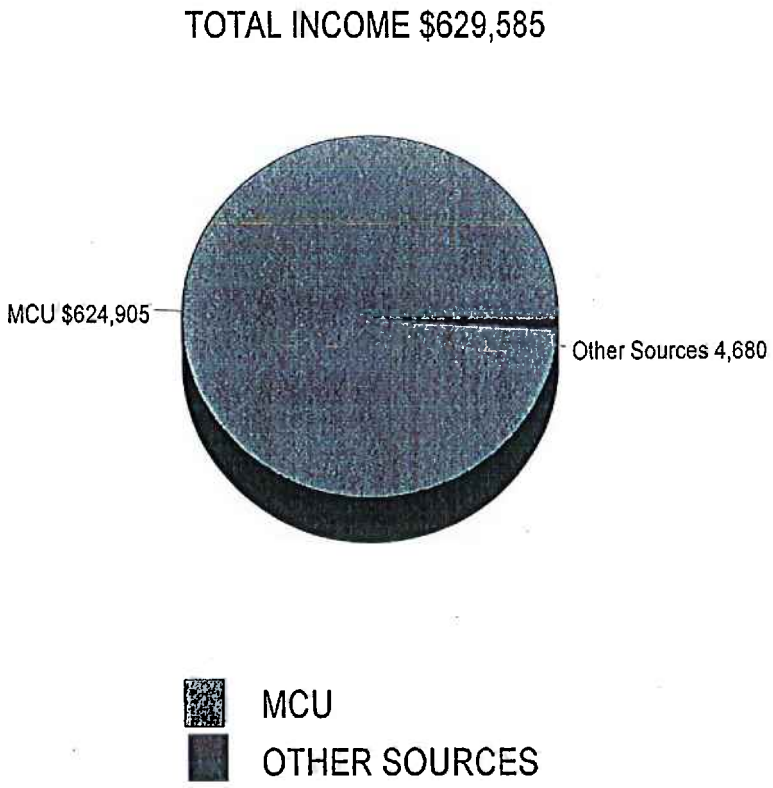
ARBORETUM BASE BUDGET TOTAL (1986$) 406350(2)

*Replacement of major equipment not included

(1) Budget item includes MNR grant & interest revenue from Rose Garden Trust fund.

(2) Funding source: University $356850.; Grants, Trusts, etc. $49500.

ARBORETUM INCOME 1986 (2003$)



Jan 22, 2003

ARBORETUM FIVE YEAR PLAN (1987-88)

OPERATIONS			CAPITAL		
1. Personnel			1. Planning & Engineering		
Permanent	250000			4000	
Temporary	55000(1)				
Benefits	32000		TOTAL		4000
TOTAL		337000			
			2. Development		
2. Maintenance & Research				41000	
Maint.	37000(1)		TOTAL		41000
TOTAL		37000			
3. Equipment			CAPITAL TOTAL		45000
Servicing	10000				
Replace*	4000				
TOTAL		14000			
4. Miscellaneous					
Telephone	6000				
Office	5500				
Travel	1200				
Other	500				
TOTAL		13200			
OPERATIONS TOTAL		401200			

ARBORETUM BASE BUDGET TOTAL (1986$) 446200(2)

691,327

*Replacement of major equipment not included

(1) Budget item includes interest revenue from Rose Garden truust fund.
(2) Funding source: University $446900; Trusts $3000.

ARBORETUM FIVE YEAR PLAN (1988-89)

OPERATIONS			CAPITAL		
1. Personnel			1. Planning & Engineering		
Permanent	250000			4000	
Temporary	60000(1)		TOTAL		4000
Benefits	32000		2. Development		
TOTAL		342000		46000	
2. Maintenance & Research			TOTAL		46000
Maint.	40000(1)				
TOTAL		40000	CAPITAL TOTAL		50000
3. Equipment					
Servicing	10000				
Replace*	4000				
TOTAL		14000			
4. Miscellaneous					
Telephone	6000				
Office	5500				
Travel	1300				
Other	500				
TOTAL		13300			
OPERATIONS TOTAL		409300			

ARBORETUM BASE BUDGET TOTAL (1986$) 459300(2)

*Replacement of major equipment not included

(1) Budget item includes interest revenue from Rose Garden trust fund.
(2) Funding source: University $456900; Trusts $3000.

ARBORETUM FIVE YEAR PLAN (1989-90)

OPERATIONS			CAPITAL		
1. Personnel			1. Planning & Engineering		
Permanent	250000			5000	
Temporary	65000(1)				
Benefits	32000		TOTAL		5000
TOTAL		347000			
			2. Development		
2. Maintenance & Research				50000	
Maint.	42500(1)		TOTAL		50000
TOTAL		42500			
3. Equipment			CAPITAL TOTAL		55000
Servicing	10000				
Replace*	4000				
TOTAL		14000			
4. Miscellaneous					
Telephone	6000				
Office	5500				
Travel	1400				
Other	500				
TOTAL		13400			
OPERATIONS TOTAL		416900			

ARBORETUM BASE BUDGET TOTAL (1986$) 471900(2)

*Replacement of major equipment not included

(1) Budget item includes interest revenue from Rose Garden trust fund.
(2) Funding source: University $466900; Trusts $3000.

ARBORETUM FIVE YEAR PLAN (1990-91)

OPERATIONS			CAPITAL		
1. Personnel			1. Planning & Engineering		
Permanent	250000			5000	
Temporary	70000(1)				
Benefits	32000		TOTAL		5000
TOTAL		352000			
			2. Development		
2. Maintenance & Research				50000	
Maint.	45000(1)		TOTAL		50000
TOTAL		45000			
3. Equipment			CAPITAL TOTAL		55000
Servicing	10000				
Replace*	4000				
TOTAL		14000			
4. Miscellaneous					
Telephone	6000				
Office	5500				
Travel	1500				
Other	500				
TOTAL		13500			
OPERATIONS TOTAL		424500			

ARBORETUM BASE BUDGET TOTAL (1986$) 479500(2)

*Replacement of major equipment not included

(1) Budget item includes interest revenue from Rose Garden trust fund.
(2) Funding source: University $474500; Trusts $3000.

APPENDIX H

Capital Projects

CAPITAL PROJECTS

ITEMS TO BE INCLUDED IN THE FIVE YEAR PLAN (1986-1991)

(1986 dollars)

I. SUPPORT

Node One:

1. Outdoor orientation area
   15000.
2. J.C. Taylor Nature Centre
   2.1. washrooms (accessible from outside)
   8000.
3. Path improvements
   2000.
4. Signage and benches
   10000.
5. Plantings
   5000.

Subtotal 40000.

Node two:

6. Entry feature
   10000.
7. Orientation area
   15000.
8. Parking (20)
   16000.
9. Landscape improvements
   10000.
10. Improved road pedestrian connection to Campus (offsite)
    by others

Subtotal 51000.

Pathway and Service Way Development:

11. Pedestrian link (campus to Node One)
    6000.
12. Rerouting and new pathways
    4000.
13. Service way rerouting
    2000.

Subtotal 12000.

Total for Support Facilities 103,000.

II. COLLECTIONS AND DEMONSTRATIONS

14. Synoptic
25000.
15. Betulaceae
8000.
16. Lilacs
4000.
17. Old field
4000.
18. Hedges and vines
6000.
19. Oak savanah
4000.
20. Shrubs and minor trees (phase 1)
8000.
21. Habitat Demonstration
4000
22 Oaks and Beeches
8000.

Total for Collections	70000.

III. FRAMEWORK AND OPEN SPACE

23. Complete major framework
20000.
24. Creek rehabilitation
16000.
25. Victoria Road buffer/framework
4000.

Total for Framework and Open Space	40000.
Grand Total for Five Year Plan	213,000.

LONG RANGE CAPITAL PROJECTS (1991-2001)

(1986 dollars)

I. SUPPORT

Node Three

26. Grant House Improvements*
64000.
27. Grounds
10000.
28. Parking
24000.
29. Demonstration gardens
50000.

* Not including kitchen facilities

Subtotal	148,000.	
Pathway Trail Development:		
30. Bridge 60000.		
31. Complete paths, signage etc. 25000.		
Subtotal	85000.	
Total for Support Facilities		233,000.
II. COLLECTIONS AND DEMONSTRATIONS		
32. Completion 75000.		
Total for Collections		75000.
Grand Total for Long Range Projects		308,000.

Grand Total for Capital Projects Under the 15 Year Plan

$521,000. (1986$)

APPENDIX I

Art Policy

UNIVERSITY OF GUELPH

Title: POLICY	Number: GE.17.0
	Effective Date: March 30, 1976
	Cancels: Amends: Jan.27/77 — Dated: Dec. 1, 1981
	Distribution: All — Page: 1 of 5

Subject: UNIVERSITY ART COLLECTION	Signature: D F Forster	
	Policy Ref:	Position: PRESIDENT

PURPOSE To encourage, develop and maintain a University Art Collection for the benefit of the University community and the Guelph area.

SCOPE All original works of art, antiques, fine craft objects, and/or other items of art acquired by the University, or its departments, schools, colleges, groups and individuals in the name of the University by way of purchase, gift, bequest, or by any other lawful means, forming a part of the University of Guelph art collection (hereinafter referred to as the "University permanent art collection").

POLICY 1. The University Permanent Art Collection

All original works of art, (reference Scope above), hereinafter referred to as "art works", acquired in the name of the University or its colleges, schools, departments, groups or individuals, on behalf of the University, either by way of purchase, gift, bequest, or by any other lawful means, belongs to the University and therefore forms a part of the University "permanent art collection".

The President of the University has delegated the responsibility for the management of the permanent art collection to the Curator of Art of the University. Certain segments of the permanent art collection may be located apart from the main collection, and separately managed while apart, however, responsibility for cataloguing, recording, evaluating, insurance protection and maintenance remains under the direction of the Curator of Art of the University permanent art collection.

1.1 The permanent art collection is comprised of various segments or groupings, such as the Print Study Collection, the Coleman Collection of Musical

Instruments and others as appropriate. These segments or groupings may be housed for educational or viewing purposes adjacent to educational art studios within the organizational units of the University and/or placed under the custody of the respective Officers, Deans, Directors, Chairmen or other Senior Officers of the University, having jurisdiction over the particular art exhibiting area or depository, which houses the segment or grouping.

1.2 The President may delegate the custody of a segment or grouping or particular items of the permanent collection through the Curator's office to a University officer for safekeeping, displaying or exhibiting on campus, or to University students and staff for educational purposes. These segments, groupings or items, will continue to remain a part of the University permanent art collection and be subject to the terms of this policy as written for the permanent art collection. Any exception to the forgoing will be set forth below.

2. Responsibilities of the University Curator of Art

2.1 The Curator of Art is specifically responsible to the President for the University's permanent art collection. This responsibility, delegated by the President, includes the safekeeping, the housing, display or exhibiting of art work to the public, the recording of values, receipting, the filing of reports, insurance coverage, evaluation, filming and reporting of values plus other cataloguing requirements in respect to the permanent art collection. The responsibility also includes the management of administrative routines associated with the art collection.

2.2 The Curator of Art also has responsiblity for:

2.2.1 Research and development, inventory control, maintenance and conservation, security and insurance protection coverage as arranged through University Security and Financial services, temporary loaning and exhibiting of the permanent art collection as appropriate.

2.2.2 Approval of the loan of items of art works from the permanent collection; the location of the art works from the collection "on campus" and the loan of art works to other galleries and institutions for display purposes other than commercial promotion.

2.2.3 Approval for soliciting of donations of art work for the University.

2.2.4 Development and presentation of temporary exhibitions and/or related art events.

3. The University Permanent Art Collection Acquisition Committee - Advisory to the President

The University Art Acquisition Committee was established to review, for approval, proposed additions and disposals of art works, the commissioning of objects of art for the University collection, as well as formulating policy pertaining to the art collection.

3.1 The Committee has formulated a permanent "art works" collection policy as outlined in Appendix "A" of this policy.

3.2 The Committee reserves the right to accept or decline any gift, bequest, or other donation in kind for addition to the collection when offered to the University. The Committee is responsible for the approval of procedures for commissioning of art works for the existing buildings and/or new buildings, when art works are required.

4. The Print Study Collection Segment

The Print Study Collection has been acquired through the efforts of Professors W. Bachinski and G. Chu and the students enrolled in printmaking classes of the Department of Fine Art. The funds to purchase prints has come from the revenues of student print sales held by the Print Study Coollection Committee. Works purchased through this generous donation of student time and money have been given to the University by the Committee. These works are to be designated as "gifts

of the Printmaking Students to the Print Study Collection". By virture of these gifts, the works have become a segment of the University Permanent Collection. The Print Study Collection is permanently located on campus adjacent to the printmaking studios and the total collection is available for viewing when printmaking classes are in session. The objective of the Print Study Collection from the outset was to provide students with the opportunity to have contact with original prints in the students' working environment of the printmaking workshop. The University community and the general public may view the print study collection by making the appropriate arrangements through the Print Study Committee by application to the Chairman, Department of Fine Art.

4.1 The President has delegated to the Chairman of the Fine Art department, the following responsibilities for the Print Study Collection segment:

4.1.1 To recommend acceptance by the President, the gifts of works from the Print Study Collection Committee.

4.1.2 To assume custody of this segment of the Permanent Art Collection in order to further the educational and research programs of the Department and the University. The conditions of the safe-keeping and display should be such to maximize access of students to the works.

4.1.3 To supply the Curator of Art with the information and photographs necessary to carry out the responsibilities cited in this Policy under section 5. This delegation shall include approval of any publicity using the Print Study Collection.

4.1.4 To approve loans, temporary or permanent, of the works in the Print Study Collection, upon and only with the recommendation of the Print Study Collection Committee. This Print Study Collection segment is not subject to the agreement of permanent loan of the University Collection to the MacDonald-Stewart Art Centre.

4.1.5 To recommend to the President the disposal through sale or otherwise of works in this segment which the Print Study Collection Committee wishes to sell.

5. Records, Cataloguing, Reporting Values, Disposals, etc., Pertaining to Committees and Officers Charged with Control and/or Custody of Segments or Groupings of the Permanent Collection

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Any Committee charged with the control or custody of University art collection groupings or segments will be responsible for the following reporting and actions to ensure the proper records, catalogues, reports, and values are maintained by the Curator of Art of the University pertaining to the University permanent art collection and its groupings or segments.

5.1 To notify the Curator in writing of any additions or intended deletions from the Collection .

5.2 To arrange to have each item numerically registered with the Curator of Art.

5.3 To arrange for the recording, identification, verification of actual state and edition, of the item by the Curator of Art for inventory recording of the item on the collection file.

5.4 To arrange for a photograph of the work for the photo record to support future claims for damage, theft, or loss, to be deposited in the Curator's office file.

5.5 To avoid duplication of technical services when the central, technical expertise is available from the Curator's office.

5.6 To determine in conjunction with the Curator, the market value and tax evaluation required for art work transactions.

5.7 Sale of art works from the collection, upon approval of the President, also require the signatures of two signing officers of the University, one of which shall be the Vice President Administration or the Comptroller.

APPENDIX J

Arboretum Centre Use Policy

UNIVERSITY OF GUELPH

Title: POLICY	Number: GE.4.2
	Effective Date: September 1, 1973
	~~Cancels~~ Amends: May 7/75 — Dated: February 4, 1985
	Distribution: — Page: 1 of 2

Subject: MEETING ROOMS ARBORETUM CENTRE	Signature:	
	Policy Ref:	Position: VICE-PRESIDENT ADMINISTRATION

PURPOSE — These guidelines are applied under the University of Guelph General Policy (G.E.4.0) dated December 1, 1977, which describes user groups, use of facilities, reservations procedures and charges for use of space.

PREAMBLE — This policy recognizes the special nature of the Arboretum Centre as a University of Guelph Arboretum facility. Use of the Centre will be restricted to University of Guelph academic and administrative units.

SCOPE — The Central Reservations and Conference office will be responsible for booking of activities into the Arboretum Centre, apart from the regular scheduled programmes of the Arboretum as approved by the Dean of Ontario Agriculture College. The following categories of other users will be recognized:

1. University of Guelph academic and administrative units.

2. Authorized users as designated by the President of the University at the time of writing are the following groups: University of Guelph Alumni Associations, The College Women's Club and The Guelph Spring Festival.

Because of its special nature, the Centre will not be available to student groups, outside users or for private use. It will not be available as a regularly scheduled classroom nor as a banquet facility. The provision of food and beverage will be strictly limited.

POLICY — Allocation:

Reservations for the Arboretum will be controlled through the Central Reservations unit, subject to the following priorities:

A. Academic, Administrative, Ancillary and Service units of the University of Guelph.

B. Non-scheduled academic requirements including departmental meetings, Senate Committee meetings, and lectures by visiting faculty.

C. Academic conferences and symposia.

D. Recognized annual activities and events sponsored or suggested by the University of Guelph, i.e. The Retirees Gathering, College Royal.

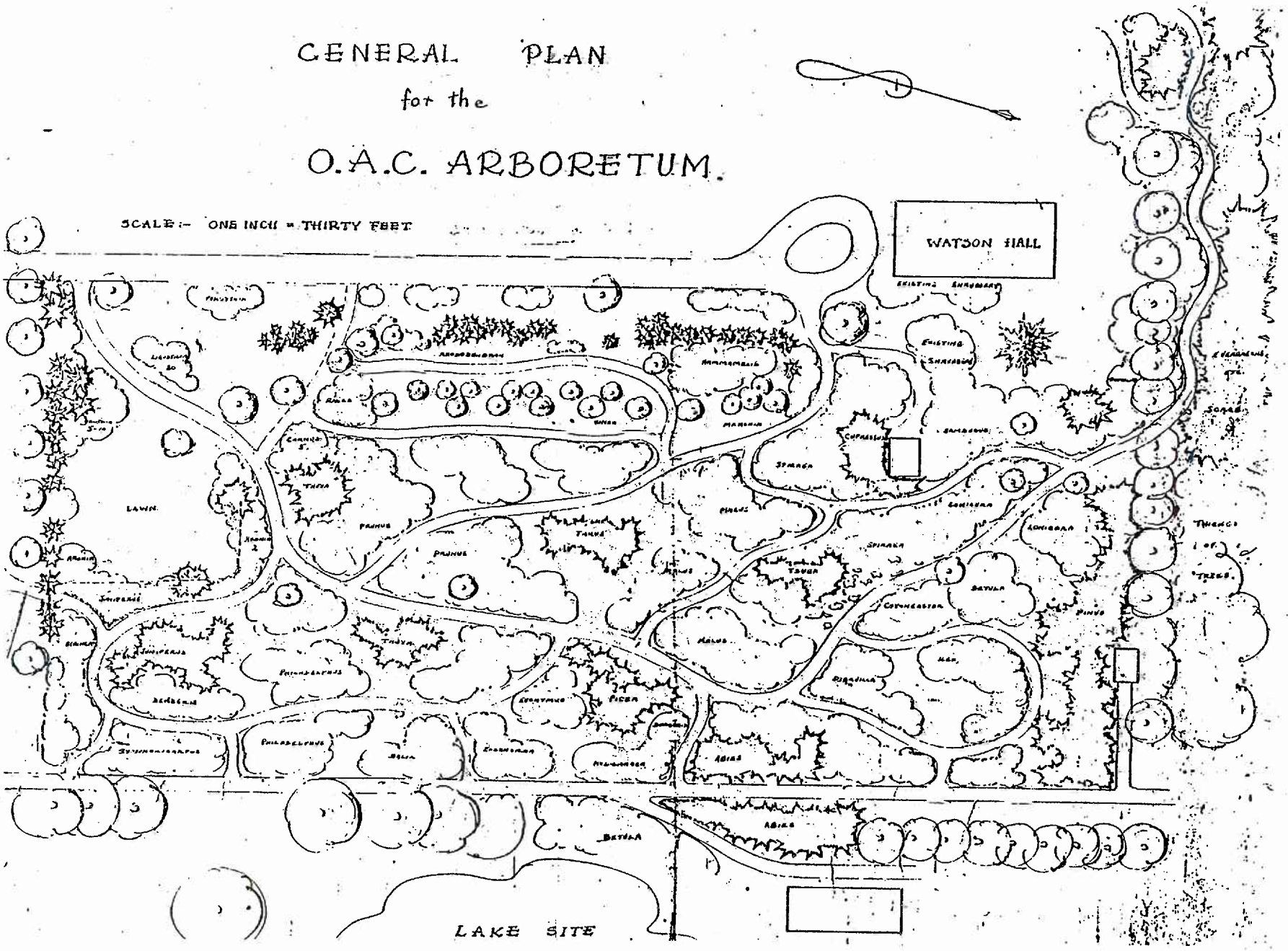
E. Other Groups subject to special authorization requiring approval of the President.

All applications for use, other than those users included in approved scheduled Arboretum programs, must be made in advance through the Central Reservations Office to ensure that the space is reserved and that conflicts in usage do not occur. The Central Reservations Office will review all bookings with the Director, Arboretum, to ensure that conflicts with Arboretum programs do not occur. It will be the responsibility of the Central Reservations Office to ensure that the appropriate campus agencies are advised of the details of projected use. Reservations for daytime use can usually not be confirmed earlier than 60 days in advance of the event. A confirmation document issued by the Central Reservations Office will be required to ensure that the space and services for each event are arranged for. A statement of costs, if applicable, will be made at the time a reservation is confirmed.

APPENDIX K

General Plan for the O.A.C. Arboretum
by L.H. Hancock, 1989.
1939

GENERAL PLAN
for the
O.A.C. ARBORETUM.



L.H.Hancock 1939